Phase Three Report: Appendix

Republic of Lebanon
Office of the Minister of State for Administrative Reform
Center for Public Sector Projects and Studies
(C.P.S.P.S.)

الجمهورية اللبنانية
مكتب وزير الدولة لشؤون التنمية الإدارية
مركز مشاريع ودراسات القطاع العام

THE REPUBLIC OF LEBANON

TRADE EFFICIENCY PROJECT M71/WB

Presented December 1998 By;

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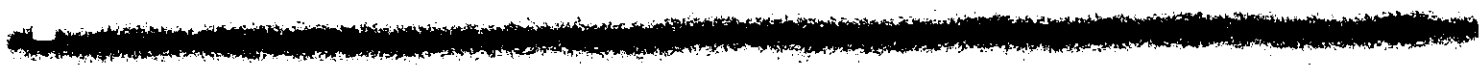

ELECTRONIC DATA INTERCHANGE: SHAPING THE FUTURE OF NATIONAL AND INTERNATIONAL CUSTOMS OPERATIONS

The following is an edited summary of remarks made by Mr T P Hayes, AO, during a speech delivered to the Pan Asian EDI Summit in Kuala Lumpur, Malaysia in July 1993. At the time of the speech Mr Hayes was Secretary General of the Customs Cooperation Council (now known as the World Customs Organisation, the WCO).

The purpose of the speech was to provide an insight into the profound changes that are taking place in Customs practise and procedure in many parts of the world. It was also designed to describe the essential role that technology, and especially electronic data interchange (EDI) is playing in these changes.

The Gatekeeper and the Policeman

In many parts of the world the remains of ancient forts, imposing castles and walled cities may be seen. These places have something in common; only one or two gateways where a visitor could legally gain admission to the interior.

In times of peace it may have been possible for a visitor to pass through the gate without challenge but the normal situation was for the visitor to present himself and his credentials to a gatekeeper before he would be allowed to enter.

Many examples of the gatekeeper function persist: some of us must carry plastic passes and present them to a guard or gatekeeper before we can gain admission to our offices. We must present ourselves and our ticket to a ticket collector whenever we attend a concert or a theatre. To board an aeroplane We must satisfy anywhere between two and four gatekeepers, one after the other, before we are allowed to board a flight or an ocean liner.

It is worth considering what are the essential elements of a gatekeeper's function. At first glance it might seem that gatekeepers are officials who check every relevant detail and insist on being 100% satisfied before they will allow passage. A moment's reflection reveals that few gatekeepers check every detail. The world would stop turning if they did. The essential characteristic of a gatekeeper is to intercept each individual wishing to pass through the gate so that they must confront the gatekeeper. This gives the gatekeeper the ***opportunity*** to check every relevant detail and the ***potential*** for denial of passage to each and every confronted individual.

In practice gatekeepers are typically treated with a considerable amount of cynicism and even disdain. This is probably for two reasons:

a) The gatekeeper function is seen as a routine, bureaucratic and mechanical task. Neither his employer nor the public expect the gatekeeper to show much intelligence or exercise too much initiative.

b) We know that gatekeepers can be fairly easily deceived. The limited basis on which a gatekeeper is forced to carry out his duties is his weakness.

Contrast this with the image of a policeman in a small rural village. It is his job to ensure that law and order prevail in the village, that its citizens are not in fear of violence and abuse and that their possessions are not at risk of theft and robbery. How does the policeman do this?

Basically the policeman makes it his business to know what is going on in the village. He collects a constant stream of information about the life of the villagers by observation and by communication with individuals. From long experience he knows the likely trouble spots, ... the pub, ... the Murphy boys, ... Mrs Busybody, etc. If he is a good policeman he will sense trouble before it arises and he might even take the step of delivering a warning.

From time to time the policeman will fail to deter someone from committing an offence. When that happens his intimate knowledge of the affairs of the village will help him to gather evidence quickly and efficiently.

Only in extremely limited circumstances might the policeman think it necessary to use the techniques of the gatekeeper. For example, in some circumstances, he might consider establishing a road block to try and catch some wrongdoers. Policemen and gatekeepers alike instinctively know that the road block has every chance of obstructing only the lawful traffic of the village.

For some people an unattractive element of the policeman's job is that it is very untidy and never complete. In this sense it is the absolute opposite of the gatekeeper's life.

It is also important to observe that the way in which a policeman operates allows the possibility of crime occurring from time to time. The policeman has no way of absolutely guaranteeing the quality of life in the village. The gatekeeper on the other hand is able to claim that those he has just allowed to enter a building have passed certain preset quality criteria, administered by him.

These anecdotes are analogous to the profound changes that are taking place in the Customs practice and procedure in many countries.

The Changing Nature of Customs

Customs regimes are now gradually abandoning the gatekeeper mentality that has dominated its thinking for hundreds of years; they are cautiously embracing the methods of the policeman. This is being made possible by the adoption of information technology, especially EDI.

Three important pressure points illustrate the factors which are making this change necessary.

Containers

Over the last forty years there has been an explosion in the volume of international trade although, on its own, this would not have forced the changes that are now taking place.

More important than the increase in volume has been the introduction of containers and the advanced technology materials handling equipment and techniques which have accompanied containerisation.

A container makes it impossible for a gatekeeper to give the contents even a cursory glance unless, of course, he insists that the container be opened. At a high tech port or airport or even at a busy autoroute border crossing it is always possible to open a container but not without significant dislocation. Even then what do you learn by looking at the first row of cartons in a 40 foot container? Not much.

Many Customs regimes have sought to alleviate the difficulties created by modern transport technology by setting up multiple inland ports. Containerised cargo is allowed to move to these inland ports and in many cases to its actual destination before it is subjected to whatever physical examination is considered to be necessary by the Customs. The widespread adoption of this approach has put a large dent in the idea that Customs is a gatekeeper. It is a little bit like allowing passengers to board an aeroplane and then having the security chaps come on board to inspect your luggage. It can be made to work but the concept of a barrier and a gate is largely destroyed.

Income Tax and Value Added Tax

It is only in the last sixty or seventy years that governments have discovered the attractions of income tax and modern indirect taxes such as VAT. Before then, governments relied heavily on Customs to raise revenue. It was not unusual for 60% or more of a government's total expenditure to be financed from Customs collections.

In developed economies that percentage is now 5% or less. In many developing countries, Customs duties have been steadily reduced. They now exist primarily for trade and industry policy reasons.

This has significantly reduced Customs' justification to persist with old methods based on the gatekeeper idea.

The collection of VAT on imports by Customs does, to some extent, re-establish an important revenue role for the Customs but VAT is a peculiar tax. A heavy hand by the Customs in administering its part of the VAT regulations is not justified because what is not collected at the frontier will, in significant measure, be collected at later stages in the VAT chain.

It is also important to note that the new large tax administrations that have grown up in most countries have not found a need, or indeed an opportunity, to adopt the ideas of the gatekeeper. In recent years these administrations have progressed the idea that it is the taxpayer that is obliged to understand the law and assess his own liability. The tax administration does not provide a quality control service. Rather the role of the tax administration is to conduct audits as and where it considers desirable for the purposes of detecting tax evasion and imposing the heavy penalties most governments provide for that offence. These ideas are also gradually intruding into the Customs world.

Quick Response and Just In Time

In the last fifty years, timescales in the world of industry have been compressed, truncated and then compressed again. Reliable speed is now seen to be a fundamental element of commercial advantage. What was once three months, became three weeks, then three days is now 36 hours. Perhaps even worse for Customs is the fact that time is now measured on a clock that makes no distinction between day and night or between weekday and weekends.

All this means that enterprises the world over now insist on being able to import urgently needed (and that means all) components, spare parts, basic materials, etc. with no detectable Customs induced delay at national borders. Worse still for Customs: national governments do not think that this is unreasonable.

Redefinition of Customs' Role

For these three key reasons and for many other lesser reasons Customs have, for several years, been engaged in a progressive change in how it believes it should carry out its task.

In many countries this change in thinking has led Customs to see themselves not as manning a barrier to international trade but as an integral part of the international trade process itself.

As a result, the administration of Customs in these countries is already much closer to the image of the policeman than to that of the gatekeeper. Procedures have been streamlined to reflect this changing philosophy. Trade facilitation, or the process of rationalising procedures which deal with trade, has become an important consideration for Customs officers. In these countries a great deal of imported cargo really does not stop moving from the moment it crosses the frontier until it is unpacked at its destination. Customs does not interfere in this process unless it has a specific reason for doing so.

For this to happen the Customs organisation, like the village policeman, insists on being very well informed. It must receive the carrier's report and, in most cases, the importer's entry declaration well before the goods cross the frontier. Customs must have confidence that the carrier and the importer want to observe the law. From experience, Customs must know that if it decides to step in and physically inspect a consignment, both the carrier and the importer will actively cooperate. Lastly the importer must accept his entire importing activities are open to regular detailed compliance audits.

However, there are perceived obstacles to allowing this policeman approach: drugs and money!

Drugs

A superficial view of the drugs problem leads many to the view that Customs cannot abandon its traditional gatekeeper approach. This is consistent with the very limited vision of gatekeepers everywhere.

The Customs experience has convinced it of just the opposite. It is simply futile to engage in fishing expeditions to try and find drugs in hundreds of containers passing through a port every day.

If the Customs pursue that approach they will be defeated, as gatekeepers are everywhere, by clever adversaries. If drugs are the problem (and in some places they are not) it is essential that the Customs does not waste its resources on mindless gatekeeper tasks. Those resources, provided they are professional, well trained and well informed, will be much better deployed in the policeman role.

Money

To explain the problem it is necessary to go back in time to when Customs was strictly a gatekeeper activity. The importer presented himself and his documents to Customs while his goods remained locked up under Customs control. Customs examined the documents, and if necessary the goods, and then demanded payment. The importer was required to pay before he was allowed to take delivery of his goods.

In some parts of the world, governments have encouraged their Customs to modernise, to liberalise their procedures; to move towards the policeman function. At the same time they have insisted that there be no relaxation in the principle that importers must pay duty and taxes before they are allowed access to their goods. This is the gatekeeping mentality at its worsts.

In many of these countries Customs duties are steadily falling; Customs is no longer the principle source of revenue. In all other areas of taxation, the government accepts that it must collect its taxes by processes that are based on the idea that the government is a creditor and the taxpayer a debtor. Admittedly, if the taxpayer defaults, the government is frequently confronted with a messy task and there will always be a proportion of taxes which will never be collected. However, if this process is good enough for the major tasks of revenue raising it should be good enough for the collection of Customs duties. Governments should resist the temptation to continue with the old fashioned idea that all imports should be sequestered until duties are paid. The world is now too small and trade flows are too complex and rapid to allow that idea to prevail. Governments that persist with this thinking are unnecessarily isolating their industries from the international market place by erecting artificial barriers to trade.

Implications for Business

For many reasons Customs in most parts of the world are in transition from gatekeepers to policemen. Increasingly they see themselves no longer as something outside the global village market but as an integral part of the market. The implications of this trend are clearly far reaching.

An essential element in making the change possible is information technology and EDI in particular.

If businesses want to take advantage of the efficiencies and streamlining that will flow from a Customs that is a policeman and not a gatekeeper then they must embrace the world of EDI.

If businesses persist with presenting paper documents to the Customs (more often than not after the imported goods have arrived) Customs will be locked into its traditional gatekeeper role. From the point of view of Customs it is only modern information technology and advance information by EDI in particular that allows it to have the ears and the eyes of a policeman. To present paper documents to a Customs officer is to limit his vision and to reduce his capacity to that of a gatekeeper.

One of the consequences of all of this is that a Customs which behaves like a policeman is likely to want to know more than a gatekeeper. The reason for this is simple. The policeman works on the basis of knowing a lot and thinking a lot. The gatekeeper works on the basis of "seeing is believing", checking the piece of paper in front of him and using a rubber stamp.

For this reason, Customs regimes which are well advanced in the transition from gatekeeper to policeman will not be content to receive, even by EDI, only an exact facsimile of the limited information normally presented to a gatekeeper. Progressive industries which recognise and understand the Customs problem are generally more than ready to respond with additional information, transmitted by EDI, when requested.

For those who cannot grasp the concept of Customs as a partner in the global village market, if they still see it as an adversary, they might as well forget about streamlining import and export information flows. Customs will just as surely see them as an adversary. For Customs to make the transition to the policeman function there has to be a great deal of goodwill between industry and Customs. Both sides must want to make the new approach work. This, of course, is a precondition for all EDI endeavours.

Conclusion

To summarise: for many pressing reasons Customs are changing from being gatekeepers to being policemen.

This cannot happen without heavy investments in information technology in general and EDI in particular. The future for Customs is rapidly moving towards:

a) Advance reporting of individual shipments by exporters, carriers and importers by EDI using UN/EDIFACT syntax and message standards.

b) Periodic self assessment by exporters and importers of their fiscal liability.

c) In depth post entry audits that often will be coupled with audits of other fiscal liabilities.

d) A policing of the normal movement of cargo based on good intelligence and comprehensive data gathered through EDI; and intervention only if Customs has reason to believe that the cargo contains prohibited goods such as drugs, toxic wastes, nuclear materials, armaments, heritage items, protected species.

The implication of all this for the international trading community is clear: use EDI or wait at the gate.

Appendix 2: American Customs Service: Trade Data Processing P. Kimberley, 1995

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AMERICAN CUSTOMS SERVICE: TRADE DATA PROCESSING

By 1993 the American Customs "Automated Commercial System" (ACS) had reached a point where it collected trade data on 95% of all imports, produced electronic releases and communicated by EDI with 1500 traders. ACS has to connect to 40 government agencies and helps enforce compliance with revenue, environmental, public health, safety and trade laws. It has electronic interfaces with seven of those agencies; more are planned, as are links with other governments.

It is evident that ACS is creaking at the joints. It was designed to automatic manual processes, hence there is a great deal of key entry and resultant errors. ACS modules are not integrated, hence inter-system hand overs are manual, and therefore slow.

In August 1992 Customs management mooted a review process. FACET, the Future Automated Commercial Environment Team, was established in February 1993. By the end of 1994 the team had completed its report. They concluded that the ACS process was outdated in view of changes in business and government processes. The traditional Customs methodology of:

- examining merchandise
- appraising merchandise
- classifying merchandise

assumes that there is one cross border or overseas supplier, that there is a single carrier and that all transactions are represented by a single invoice.

This is clearly no longer valid. In 1994 there are multi-source suppliers and manufacturers, from different countries, inter modal carriers and highly detailed electronic invoice messages.

In addition, after 30 years of continuous tariff negotiations there has been significant international shifts in regional and bi-lateral trade agreements. Present customs systems cannot easily cope with the more precise data demands now placed on them. In particular, the demands of NAFTA, draw-backs (reexport duty claims and refunds) and Foreign Trade Zones have pushed ACS to the edge. There is no room for expansion and change. ACS must be totally reengineered, redesigned and redeveloped.

The specific FACET recommendations included:

I. Original commercial data received from declarants should be used as the basis for government processing.

II. Import and export requirements and systems should be standardised and integrated.

III. A trade database and processing structure should address the needs of the various government agencies mandated to perform trade regulatory functions.

IV. The trade database should be viewed as an asset, belonging not just to Customs, but to both the entire government and the private sector.

V. Customs must develop a commercial operations policy of employing disciplined system development and data management techniques to guarantee the availability and integrity of quality data.

I. Original commercial data received from declarants should be used as the basis for government processing

FACET believed that Customs had to change the basic definition of what information is needed for processing import and export transactions and tracking international trade. They recommended the elimination of traditional customs documents such as the manifest, the release document, and the summary. These are artificial aggregations of commonly available business information such as invoices and bills of lading, which are much more valuable and reliable as data sources.

The FACET proposal is to adopt these invoices, their lines, the bills of lading and the transportation movement information as the basic unit of information for all trade transactions. This source commercial data, combined with specific other data required for a particular process, will comprise the core data for a transaction, and will establish a transaction record for either an import or an export. All additional requirements for Customs and other government agency activities will be appended to the transaction record, as necessary, as the transaction progresses through government processing to completion and archive.

If each transaction contains this basic data, together with a full electronic environment and relational database capabilities, data can be collected and stored in as transactions flow through the life span of government processing and tracking. Information can be gathered to provide the most meaningful information for the task at hand, whether by importer account, time periods, commodity, or any other data requirement.

Once information about a commercial line item has been established in the system, later processes will require only new data. The system will be able to link the new data with the original data, along with the latest activity and status information. Hence the system will automatically compile a complete 'cradle-to-grave' history on any given commercial line item. For example:

> *An importer wishing to protest the liquidation of an import shipment will supply only the new information detailing the nature of his protest.*

The commercial line item information for the protested shipment(s) has already been supplied in the import process. The system will electronically append this new protest data to the relevant commercial line item record(s). When the import specialist reviews the protest, he will have access to full information about the protested line items, their liquidation history, as well as all other activity which may affect the decision about the protest, such as prior import specialist review findings, examination discrepancies, voluntary tender submissions, or other protests on related issues. When a decision is rendered on the protest and input into the system, that information also becomes part of the electronic record for those commercial lines, available for viewing, analysis, and/or processing by other system users.

This concept of retaining and reusing data at the commercial line item and transaction level as a permanent record provides the basis for full and accurate risk analysis.

Such a level of detail with relational data base capabilities enables comparison and analysis of virtually all data from its original source, thus removing the current limitations on accurate analysis that result from using data that is aggregated (often erroneously) onto customs forms and in the current ACS formats.

The system will empower users with capabilities for viewing and working with detailed information in myriad ways based on their individual needs. Data will be easily aggregated, or summarised, at a higher level, such as by account or period of time. Likewise, the system will be able to readily display the fundamental commercial details when a user wishes to view the in-depth information behind the summarised data. For example:

An import specialist wishing to review the import activity for a particular commodity by importer or group of importers over a selected time span will readily be able to have the system find, assemble, and present this information in a summarised format. If the import specialist notices that some of the summarised data is incorrect or anomalous, the system will provide the associated commercial line details.

Significant improvement in the accuracy of trade statistics, risk and trend analysis, revenue accountability, and compliance will be achieved by standardising processing on business data. Trade users will be able to discard the preparation of manifests, entries and entry summaries, as well as many other government forms. Virtually millions of dollars in trade costs will be avoided by government acceptance of a new core of information that mirrors the information already available in normal business transactions.

Transaction information will flow into ACE (Automated Commercial Environment) as a continuous stream of electronic data, provided directly by the information sources, the parties-in-interest. The data stream concept

provides the flexibility for carriers, brokers, importers, government officers, and other authorised users to add, update and amend the data for a particular commercial line item as additional information becomes available, or as new actions are to be performed. Each data element for a given import or export shipment will be transmitted and stored only once. Each piece of information may be accessed by many users for many different purposes. The system will perform basic edits and validations of data as it is transmitted, but processing of the data will not occur until the core data requirements of the particular process have been fulfilled. Core data can be defined as the total of all data elements that are necessary to perform a specific process for a shipment, including any required certifications or electronic signatures. The specific data elements comprising core data will be defined for each process, such as cargo release, permit to export, liquidation, drawback, etc. An import cargo release example will be used to illustrate the use of core data:

> *A small shipment of textile samples is shipped from Japan to Los Angeles by vessel. The carrier transmits the master bill information, which initiates the creation of a new transaction record in the system. Shortly thereafter, the non-vessel operating common carrier (NVOCC) transmits the two house bill numbers for this shipment, including quantities and other specifics, which the system appends to the transaction record opened earlier.*
>
> *This information, although added and now stored in the system, does not meet the core data requirements for the release of cargo, since the system has not yet received the detailed commodity information for the transaction. Accordingly, no processing beyond a basic data edit and validation occurs at this time.*
>
> *The importer now transmits the invoice and visa information for the shipment. However, the core data requirements for cargo release are still not met. Only when the broker transmits the associated tariff classifications will the system be ready to begin the cargo release processing, provided the importer or his broker has also supplied the appropriate certification data.*

Note that the order in which the parties-in-interest transmit the data is not important; it is the fulfilling of the core data requirement that is critical, in whatever order that happens to be for a given shipment.

II. Import and export requirements and systems should be standardised and integrated

Since imports and exports are the two sides of the international trade coin, the information requirements of both processes should be identical for trading purposes, and very similar for Customs purposes. The source commercial data for merchandise shipments is the same whether the goods are imported or exported. The merchandise must always be described, valued, quantified

and tracked as it moves from point to point; invoices, bills of lading and transportation movement information are present for both imports and exports.

Frequently an import transaction later becomes part of an export transaction and the reverse is also true. An integrated commercial system will permit the automated correlation of an export shipment to the earlier importation when a drawback is claimed. A temporary importation under bond (TIB) can be closed and the import bond discharged within the system once the export declaration is posted. The automatic tracking of immediate exports (IE) and transportation and exportation (T&E) shipments are two other benefits.

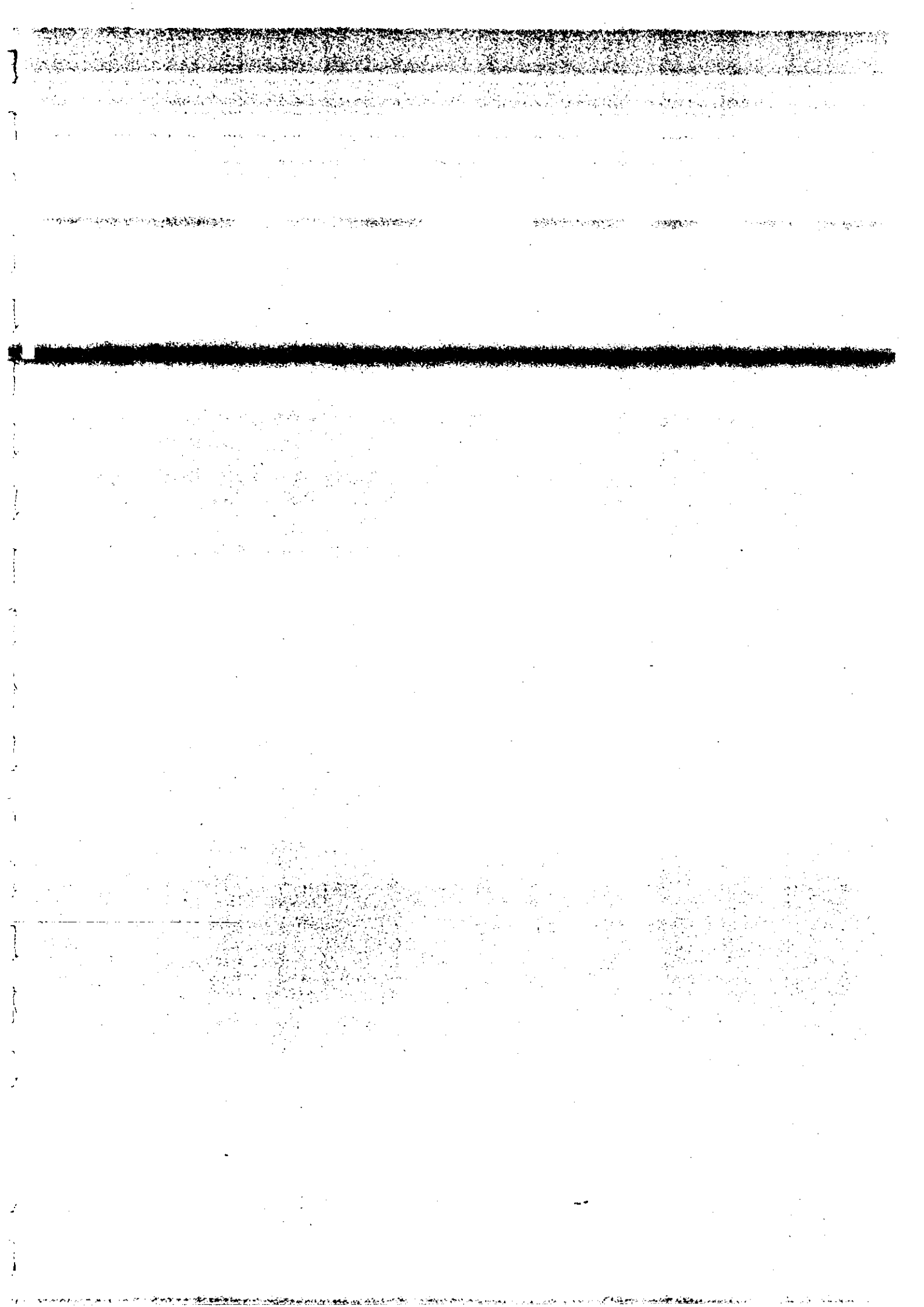
Valuable trend information can more easily be constructed if imports and exports are based upon the same data requirements. In today's world, a company is rarely only an importer or an exporter; they are both. The ability to view the entire scope of a company's import and export business will allow full verification of compliance with all applicable laws and regulations. Comparison of import and export data at the commodity level will also permit detection of inconsistencies, such as when the amount of imports of a commodity claimed as American Goods Returned significantly exceeds the amount of that commodity exported from the US. Additionally, such analytical capability could be very significant in evaluating the level of excise and other tax compliance for a particular corporation.

III. A trade database and processing structure should address the needs of the various government agencies mandated to perform trade regulatory functions

The new ACE will be the conduit for the capture, processing, storage and passage of trade data for use by other governments and other government agencies. In other words, Customs' database will become a governmental community information pool. As the nation's lead border agency, interacting with some other agencies of the U.S. Government, Customs receives and processes shipment data for all types of import and export transactions. Customs also enforce and certify compliance with certain requirements imposed by foreign governments on U.S. exports to their countries.

Much of the information captured and used by Customs is also needed by these other agencies, but they often require their own paper forms to accommodate their need for this same data. This duplication of data, in addition to the sheer proliferation of paper forms, poses a burden on both the federal government and the entire trade community. The trade community has consistently and loudly stated that they wish to deal once with the U.S. government on import/export transactions.

With the passage of NAFTA, alternative means of information exchange among the three governments are being developed. The goal is a standardised system of customs operations, built on a foundation of common data elements, documents and processes, which will be used by the three



Appendix 3: Customs Risk Management
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CUSTOMS RISK MANAGEMENT – OPPORTUNITIES, OPTIONS AND OBLIGATIONS FOR FREIGHT FORWARDERS

FIATA WORLD CONGRESS
SYDNEY 22 SEPTEMBER 1998

PRESENTED BY: COLIN VASSAROTTI
AUSTRALIAN CUSTOMS SERVICE

CUSTOMS RISK MANAGEMENT – OPPORTUNITIES, OPTIONS AND OBLIGATIONS FOR FREIGHT FORWARDERS

INTRODUCTION

I want to talk to you today about:

- saving money
- increased cargo facilitation and
- improved Customs effectiveness

These are worthy objectives indeed and I am sure you will agree they are in the mutual interests of traders, governments and the general community.

To achieve them the Australian Customs Service (ACS) pursues three central strategies:

- risk management
- technology and
- intelligence

Both risk management and technology impact directly upon the "..... Logistics Solutions, through Technology" theme of this Congress. So they will be my main focus.

My presentation is in three parts:

1. Risk management – what it is, how Customs uses it and what it means for freight forwarders.
2. The current ACS computerised cargo clearance systems.
3. Our plans to re-engineer comprehensively the cargo management system, the forwarders' role in this and the benefits.

THE PARADOX

Customs Administrations worldwide are struggling to resolve an apparent paradox. On the one hand, Governments demand better control over cargo fraud and smuggling. On the other hand, governments and traders are pressing strongly for increased facilitation of trade and reduced costs of compliance with border management requirements. In essence, the challenge is to deliver better enforcement with more facilitation, and less bureaucratic red tape: all at a reduced cost.

This seems an impossible paradox. But it can be resolved by sound risk management and co-operative effort in business processes, between Customs and industry.

RISK MANAGEMENT

Risk is generally thought of in a negative connotation; for example, an adverse outcome such as financial loss. Importantly, risk strategies can also produce positive outcomes such as more efficient ways of doing business.

So, just what does Customs mean by risk management?

Historically, risk management was the purview of the insurance, portfolio management and banking industries. In Customs, risk management allows us to sift quickly and efficiently through the millions of cargo transactions and people movements we deal with and identify those which pose a compliance or enforcement risk. We can then concentrate our efforts on those particular suspicious movements and transactions. Another very real benefit is that it allows us to reduce operational costs by using our resources more efficiently. Put simply, it saves money and improves our operational effectiveness.

But what does this mean to freight forwarders and the rest of the international trading community?

The resounding answer is that it saves you money.

Because risk management allows Customs to be more accurate in identifying risk transactions, the result is less intervention in the flow of freight across the border, more predictibility and fewer unexpected delays. In short, the vast majority of cargo is facilitated and any cargo delayed is cargo which is very likely to constitute a real risk.

The methodology, and terminology of the Australia/New Zealand risk management standard (AS/NZS 4360: 1995) (the Standard) is being used internationally in a number of Customs administrations. The Australian Customs Service is proud to have been a key contributor to the development of this Standard. We were members of the committee which produced the Standard and have used it in the development of the implementation of Customs corporate policy on risk management. This ensures all of our business systems are based on sound risk management.

Customs administrations within APEC economies are progressively moving towards adoption of the methodology of the Standard as are several other non APEC Customs administrations. The World Customs Organisation is incorporating material drawn from the Standard into the Guidelines on Customs Control contained in the Kyoto Convention on the Simplification and Harmonisation of Customs Procedures. Under the revised Convention it will be mandatory for contracting parties to use risk management in applying Customs controls.

The Risk Management Cycle

Now for some risk management theory.

One of the major attractions of risk management is that it is based on a simple, elegant process. By working logically and methodically through the five central stages of the risk management cycle, managers are able to reach sound judgements about the nature and true level of risk they are dealing with and how best to manage it. In Customs we have found that managers and staff alike have been able to apply the methodology readily within their areas of responsibilities and that improved decision making and efficiency have been the result.

The cycle is represented in Figure 1 and consists of:

- *establishing the context (strategic/operational/ tactical)*
- *identifying the risk*
- *analysing the risk*
- *evaluating and prioritising the risk; and*
- *treating the risk.*

There are two further features of the risk management cycle which are continuous throughout the entire life of the process being risk managed. These are;

- *communication and consultation; and*
- *maintaining a continuous monitoring and review strategy*

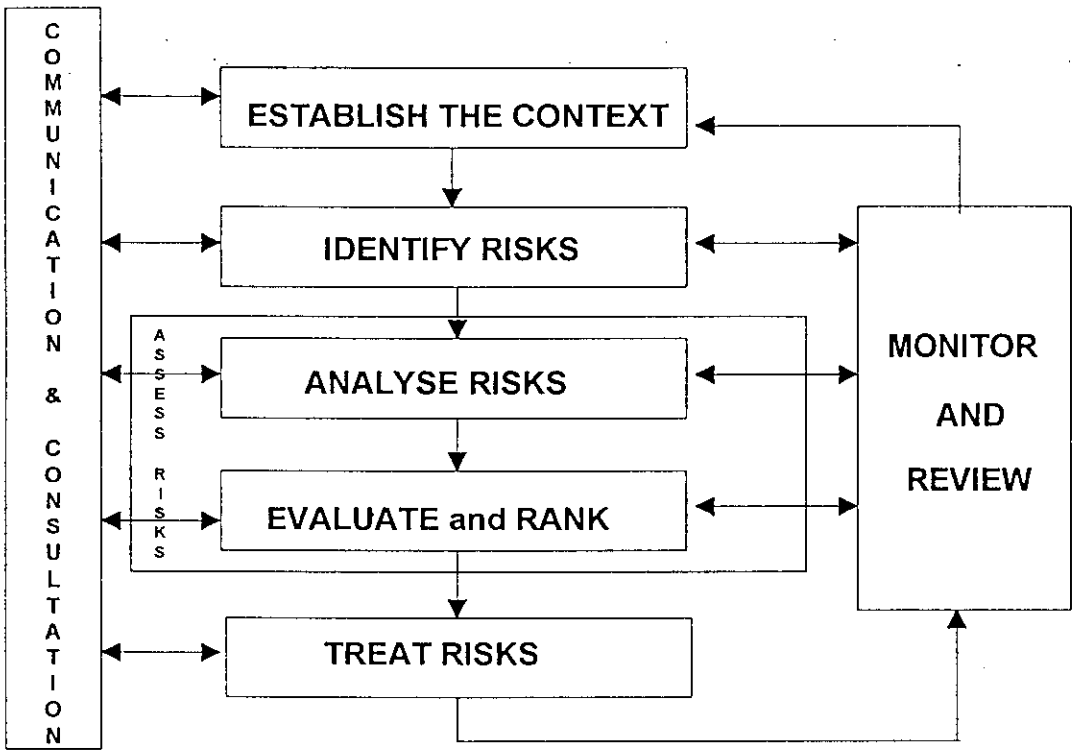

Figure 1 Source AS/NZS 4360:1995 Reproduced with permission of Standards Australia New Zealand

The appendix to this paper explains these steps in broad outline. More detail can be found by reference to the actual Standard which is available for purchase from Standards Australia.

Profiling and Targeting

These are the primary tools Customs uses for identifying high-risk cargo, people, commercial transactions and business.

A **profile** is a group of characteristics, information, or risk indicators, which describes existing or potential groups of targets. Some or all of these indicators tend to be present in any specific instance, displayed in common by cargo shipments, commercial transaction, business and passengers, for example, smuggling narcotics at a given location at a particular time of the year. In developing a profile, data is gathered, systematically charted and analysed and then disseminated into a profile.

Profiling allows selection for examination only those cross border movements of people or goods which are likely to be involved in illegal activity, or identifying companies for closer scrutiny because of their higher likelihood of non-compliance.

Targeting is a selective process to further identify specific people, goods, commercial transactions or business of interest to Customs that fit a profile.

The success of profiling and targeting depends upon, among other things, a very good understanding of the context in which the "risk" event (transactions, cargo or people) occurs. For example, in the enforcement environment, a profile is a tool that can provide Customs officers with a picture of a smuggler or the *modus operandi* of a smuggling operation. Similarly, audits of companies are expensive and may be a costly way to improve compliance when awareness training or other approaches may be more effective. Hence, the need to effectively manage Customs interaction with business for the best outcome.

Computer technology allows the testing of large volumes of movements and transactions against profiles and the subsequent targeting of those which constitute a match. Our experience in a Customs environment is that best results are obtained if risk management is combined with a strong information technology base.

WHAT DOES RISK MANAGEMENT MEAN FOR CUSTOMS AND FREIGHT FORWARDERS?

Customs

Customs has a critical role to play in contributing to microeconomic reform in Australia, an essential part of which is fast-tracking international trade transactions. We have found the disciplined application of risk management is a key strategy for fulfilling that role.

The main focus for implementing risk management over the past two years has been in the core business areas of Commercial Services and Border Management. The Commercial Compliance Branch, which is responsible for post audit of commercial transactions, was the first area to formally introduce a disciplined approach to modern risk management methodology. It is noteworthy that the Australian National Audit Office (ANAO) recently completed an intensive performance audit of risk management in the ACS and concluded in its report to Parliament that Customs is in the forefront of the Australian Public Service in applying risk management (ANAO 1997: xiii).

Forwarders

Risk management depends on quality information. For sound risk management decision making it is absolutely critical that the information upon which decisions are based is accurate, relevant and timely. A responsible approach by traders, including forwarders, to ensuring the accuracy of data is an essential element of the self assessment principles inherent in the Customs approach to risk management.

It is worth reiterating also, the element of timeliness. To meet the service expectations of the freight forwarding community, cargo risk management decisions must be made before the cargo is discharged or, in the case of exports, before loading.

The Customs Service Charter (1998: 3) puts our standards on the public record. I quote:

If you lodge an Electronic ***cargo report***	We aim to transmit delivery advice for cargo immediately **on vessel/aircraft arrival**, provided a physical examination is not required. To achieve this we require:

- a full and accurate report to be submitted, in the case of sea cargo 48 hours and in the case of air cargo 2 hours, prior to arrival, and

- Customs entry formalities to be completed.

*If you lodge an **import entry** electronically*

Entries lodged electronically will be accorded a higher processing priority than those lodged manually. We aim to transmit a release advice to importers within 30 minutes of entry payment, provided all other Customs and AQIS requirements have been met.

Better, earlier, accurate information means less Customs intervention and greater facilitation. Most importantly, the primary outcome for traders is speedy delivery of low risk consignments – which, after all, are the vast majority.

WIDER USES FOR RISK MANAGEMENT

The Risk Management Standard is generic. It is designed for use by both private and public sector organisations. The Australian Government has, for example, published Guidelines (MAB/MIAC 1995) for managing risk in all Australian Public Service agencies.

Australian private sector companies are also adopting the Standard which has proven to be one of the best selling publications of Standards Australia. There is a high level of interest in production of an equivalent document by the International Standards Organisation (ISO). A working party has been established for this purpose by ISO and meets for the first time next month, in Tokyo.

My remarks today have concentrated on how Customs risk management affects freight forwarders. Nevertheless, the forwarding industry constantly manages risk within its own operations and would no doubt, find the methodology of the Standard useful. In making this point, I have in mind the operational risks confronting forwarders in dealing with dangerous goods, meeting the requirements of aviation security, accuracy in load distribution and restraint as well as general compliance with the wide range of government regulatory requirements applying to international goods transport and clearance.

Sound risk management requires a professional approach by all of an organisation's management and staff. I know, for example, that

in Australia, the Australian Federation of International Forwarders (AFIF) addresses its risk exposure by encouraging and developing uniform standards of professional conduct and accredited education tailored specifically to the freight forwarding industry (AFIF 1998). Education of staff is a very important and effective risk treatment.

TECHNOLOGY IN AUSTRALIAN CUSTOMS

As we have gained experience with risk management in the Australian Customs Service we have increasingly implemented it within our business processes, particularly our information technology. We have found that the combination of risk management and information technology is extremely effective in delivering increased facilitation and improved enforcement outcomes.

Australian Customs has been at the forefront in the use of computer technology since 1972 when the first integrated national system for processing import entries was introduced. On line access to Customs by importers and brokers has been available throughout Australia since 1976 – more than 20 years. I make this historical point for two reasons. First, we have gained substantial experience with live, on-line, interactive computer systems over many years. Secondly, because that experience has been in Customs administration, Australian Customs is recognised as an international leader in the field. An important point is that our systems are national and cover all of Australia's major Customs ports and airports. Our credentials are sound.

CURRENT ACS COMPUTERISED CARGO CLEARANCE SYSTEMS

Import Cargo Reporting Systems

Air Cargo Automation (ACA)

ACA was introduced as a single airport application in 1990 at Australia's largest airport, Sydney. National implementation was completed in 1991. The system accepts electronic cargo reports (air waybills) and these are processed by ACA against known Customs and quarantine risk parameters stored on the Common Profile Engine. It then reconciles these against import declaration detail through the 'Single Status Engine' system. Customs and Australian Quarantine and Inspection Service (AQIS) officers are able to select information for display and assess the potential risk of consignments not identified by automated profiles. Electronic report of air cargo is required at least 2

hours prior to aircraft arrival to enable processing to be completed and delivery status to be notified at the time of arrival.

Sea Cargo Automation (SCA)

SCA provides for the sea cargo industry essentially the same electronic report and clearance facility as ACA. As with ACA, delivery status is transmitted on vessel arrival. Because of the complexity of maritime industry, the project was introduced in phases. Phase 1 dealt with containerised cargo only whereby manifests previously submitted manually by principal agents, slot charterers, and freight forwarders have been replaced by EDIFACT EDI messages which are processed using the single status and common profile engines as described above for air cargo. The application also caters for requests and approvals to unship goods and the movement of goods under Customs control. The second phase extended the application to include bulk and general cargo.

Import Cargo Entry Systems

COMPILE/EDIFICE

COMPILE is the latest generation Customs import declaration system. It can be combined with an EDI front end, EDIFICE, to enable the system to provide a true EDI Customs declaration and clearance facility.

By using COMPILE, Brokers/Importers create Customs entries in their own offices, direct from their commercial documentation. As the data is entered to pre-formatted screens, the COMPILE system:

- Edits and validates the data, reporting any errors for immediate on-line correction
- Handles currency and quantity conversion
- Determines the customs value of the goods and calculates the customs duty and sales tax payable
- Adjusts any remaining import credit balances where applicable, and
- Compares the data against community protection profiles

When the declaration has been created and any face of entry edit queries satisfied, COMPILE allows the importer to lodge the declaration by answering declaration questions on the screen. COMPILE will then compare the detail against known risk parameters and advise whether the declaration has been accepted without further formalities (green line) or further information is required (red line). Importers who are unsure of any aspect of the declaration may

indicate this and the transaction will be routed for further action (amber line).

Once stored on the system, declarations may be amended or withdrawn at any time prior to delivery. Upon entry lodgement, if there are no impediments, duty payment may be made by EFT from the broker/importer terminal.

The system handles in excess of 98% of Customs import declarations and provides Customs with a comprehensive database for research and risk analysis through the research tool, TRACE.

Cargo Status Advice Systems

Single Status Engine (SSE)

The Single Status Engine was developed in response to industry requests for a single point of contact with Customs to determine the status of goods under Customs control.

The SSE links the various internal Customs systems and those of other Agencies involved in the import of goods to:

- Provide a repository of information about the status of cargo under Customs control at any point in time
- Reconcile and integrate cargo status in Customs business systems and report any changes to the relevant application(s) affected
- Incorporate status advice received from other Agencies
- Provide an enquiry facility to internal users and owners/brokers through their host applications
- Transmit delivery status to the holder of the cargo upon vessel/aircraft arrival

Export Cargo Reporting and Entry Systems

EXIT

The EXIT application combines the features of COMPILE and Cargo Automation to automate the declaration and report of exports. It links Customs with exporters or their brokers, consolidators and freight forwarders, airline and shipping companies, export Permit Issuing Authorities, and the Australian Bureau of Statistics.

Exporters apply for clearance by transmitting an export declaration, which is automatically processed within a service standard time of 10 minutes. In response the computer application returns an 'export clearance number' (ECN) which identifies the consignment through the consolidation, transport and export chain.

Carriers report export manifests electronically and ECN details are automatically acquitted against declarations to provide timely information for control and statistical purposes.

Where goods are subject to restrictions, the relevant authority is automatically notified enabling preparation of necessary permits. In such cases, the system requires the permit number before approval to export is granted.

A single electronic window to government for meat exports which require clearance by AQIS has been recently implemented. This has been achieved by linking the Customs EXIT system with the AQIS export system, EXDOC. It allows exporters who need to obtain export clearance for a particular consignment from both EXIT and EXDOC to submit the required data via a single message. EXDOC passes on the appropriate data to EXIT for processing and subsequent return to the exporter via EXDOC.

Profiling and Targeting Systems

Common Profile Engine (CPE)

The CPE is a tool accessed by Customs applications as an aid in risk assessment. It allows incoming data to be assessed against risk criteria to determine consignments and transactions requiring closer scrutiny. The application allows officers to construct profiles against any data field or a combination of fields for any period. Profiles may have national or local effect. The CPE has played an important part

in many successful enforcement outcomes in allowing Customs to correctly identify suspect consignments.

Customs cordially invites Congress delegates to experience our computer systems at first hand by visiting our exhibit stand at this Congress.

REENGINEERING – THE FUTURE OF CARGO MANAGEMENT

The computer systems which I have outlined are generally regarded as world class. Collectively they constitute a data conduit between industry and Customs. They save costs for industry and government, facilitate cargo clearance and contribute to Customs effectiveness.

But we are looking to the future. Trade is expanding rapidly, business needs and practices are changing, technology is improving and increasingly influencing change in business processes. At the same time the enforcement challenge of Customs is increasing in complexity.

We know we must move forward. It is imperative we ensure the technology we use is the most modern available. Even more importantly we must ensure our business processes are harmonised with the needs of industry and government. In short, we have recognised the need to re-engineer the cargo management system, and not simply convert our current business systems to operate on new technology. We have also determined that our business systems must be built upon sound risk management principles.

As a first step, we have consulted extensively with importers, exporters and the service industries involved in the international trading cycle as well as key government agencies. From these consultations we have been able to identify the primary needs which all parties believe should be met by the future cargo management system. We have also identified significant developments in international trade business practices and related information technology trends which are likely to impact upon cargo management within the next 3-5 years.

Future Concept

Against this background it has been possible to evolve the broad outline of a future cargo management concept. In brief, the five main elements of the concept are:

- Direct access by Customs and AQIS to relevant carrier, cargo handler and owner import and export cargo data for risk management purposes

- Use by these agencies of high performance profiling and analysis facilities to identify and deal with transactions according to their true level of risk

- Streamlined, minimal cargo reporting requirements

  - Including provision of a single window to government agencies involved in the clearance process

- Periodical entry and deferred duty payment for approved importers and periodic entry for approved exporters

  - EDI, Internet and interactive electronic entry facilities for all other import and export transactions

- No Customs or AQIS intervention in cargo flow processes except in cases of significant quarantine risk or suspected criminal activity

  - This requires co-ordination of all government activity which has the potential to create last minute clearance problems which delay cargo

- Establishment of a cargo handling data pool for access and update by authorised commercial parties and relevant government agencies

Over the coming months we will work with our colleagues in industry and government towards re-engineering our business processes. We will do this with the common purpose of working towards achievement of our shared vision for an improved cargo management system.

Conclusion – Opportunities, Options and Obligations for Freight Forwarders

By now I am sure you will see the very real **opportunities** opening up for forwarders and other members of the international trading community by the re-engineering of cargo business processes to reflect the combined power of risk management and information technology. There are very real savings in prospect arising from improved facilitation and reduced data costs.

The **options** are to re-engineer or to persevere with existing systems and processes. Choosing the status quo would mean being locked into the past with outmoded and inefficient business processes. A

further severe disadvantage is that these processes are based on the presumption that Customs clearance requires special data reporting arrangements which cannot be derived directly from the commercial data stream. The degree of benefit which can be obtained from risk management strategies would also be severely restricted.

The **obligations** for forwarders can be summarised as: willingness to co-operate with government agencies in providing access to relevant commercial data, responsible self assessment to ensure the accuracy and timeliness of that data and, most importantly, working with the agencies to develop a future system which best meets the needs of all parties.

In Australia, we are fortunate to enjoy an constructive working relationship between government agencies and the international trading community. This is amply demonstrated by our participation in this Congress at the kind invitation of FIATA and on the recommendations of AFIF. We are working together towards re-engineering the cargo management system to build a better future.

APPENDIX 1

THE RISK MANAGEMENT CYCLE EXPLAINED

Establish the Context

The first step is to establish a clear understanding of the operating environment. This entails identifying and scoping all influences, such as political, economic, social, staffing, financial considerations and client perceptions, which may impact upon the function being examined. In addition, criteria for determining acceptable levels of risk are decided.

Identify Risks

Risks must of course be identified before any effort to deal with them can be made. A wide a range of people as possible with relevant knowledge and experience in the area being risk managed within the organisation are canvassed. It is also better if all risks, no matter how trivial they may seem, are included; they can be rejected if necessary at a later stage of the cycle, but by initially including all suggestions a more complete picture is established.

Having identified the risks that can occur, techniques such as profiling and targeting are used to identify more specifically those commercial transactions, business, cargo and people that potentially have a high risk exposure.

Analyse Risks

The size or level of risks is estimated, in terms of their **Likelihood** of occurrence and seriousness of impact (**Consequence**) when they do occur. This combination of likelihood and consequence gives the **Level of Risk** in question.

Evaluate and Prioritise Risks

After risks are identified and analysed they are evaluated. This involves deciding whether individual risks are small enough to accept as being of no significant threat to the organisation and its goals. If a risk is rated as significant threat then something is done about it. Once the unacceptable risks are identified, they are ranked in order of importance, so that the most serious risks can receive the highest

priority. This stage of the cycle is frequently referred to as "risk assessment".

Treat Risks

The most crucial phase is the treatment of risks. The treatment must be suitable to the type of risk and appropriate to the seriousness of the risk. Let me give you a business example. Would you devote the same resources and method to pursuing a $100 bad debt as you would to a $100 000 debt? I think not. Likewise Customs must decide what is appropriate in the circumstances. One size does not fit all – the treatments must be cost effective and capable of significantly reducing the likelihood and/or consequence of the risk.

* Some examples of risk treatments are:

  - legislative measures
  - education programs on such matters as self assessment and reporting suspicious transactions
  - post transaction audits
  - partnerships with business
  - profiling and targeting
  - surveillance of suspect transactions or movements
  - search and seizure, and
  - withdrawal of privileges

Of course these treatments require effective information systems, and quality data and intelligence.

Communication and Consultation

Perceptions of risk can vary significantly between technical experts, operational staff, decision makers and stakeholders. For this reason, once a risk treatment plan has been developed it is essential to ensure that its general features and, in particular its effectiveness in dealing with risk of concern to stakeholders, are communicated to the stakeholders. Communication of the same information to the people responsible for management and operation of the treatment plan is also essential.

Monitor and Review Risks

Once risks are treated, the process of risk management is far from over. Risks are monitored to establish whether or not they are changing in either seriousness or nature, or whether new risks are arising from changing circumstances. The information about risks gained in the monitoring and review process is used to update the risk profile for the next cycle of risk management. It is also useful to review the effectiveness of the risk management process itself to ensure that important risks are not overlooked or incorrectly analysed.

Communication and Consultation

Risk communication and consultation with stakeholders is an important consideration at each step in the risk management process.

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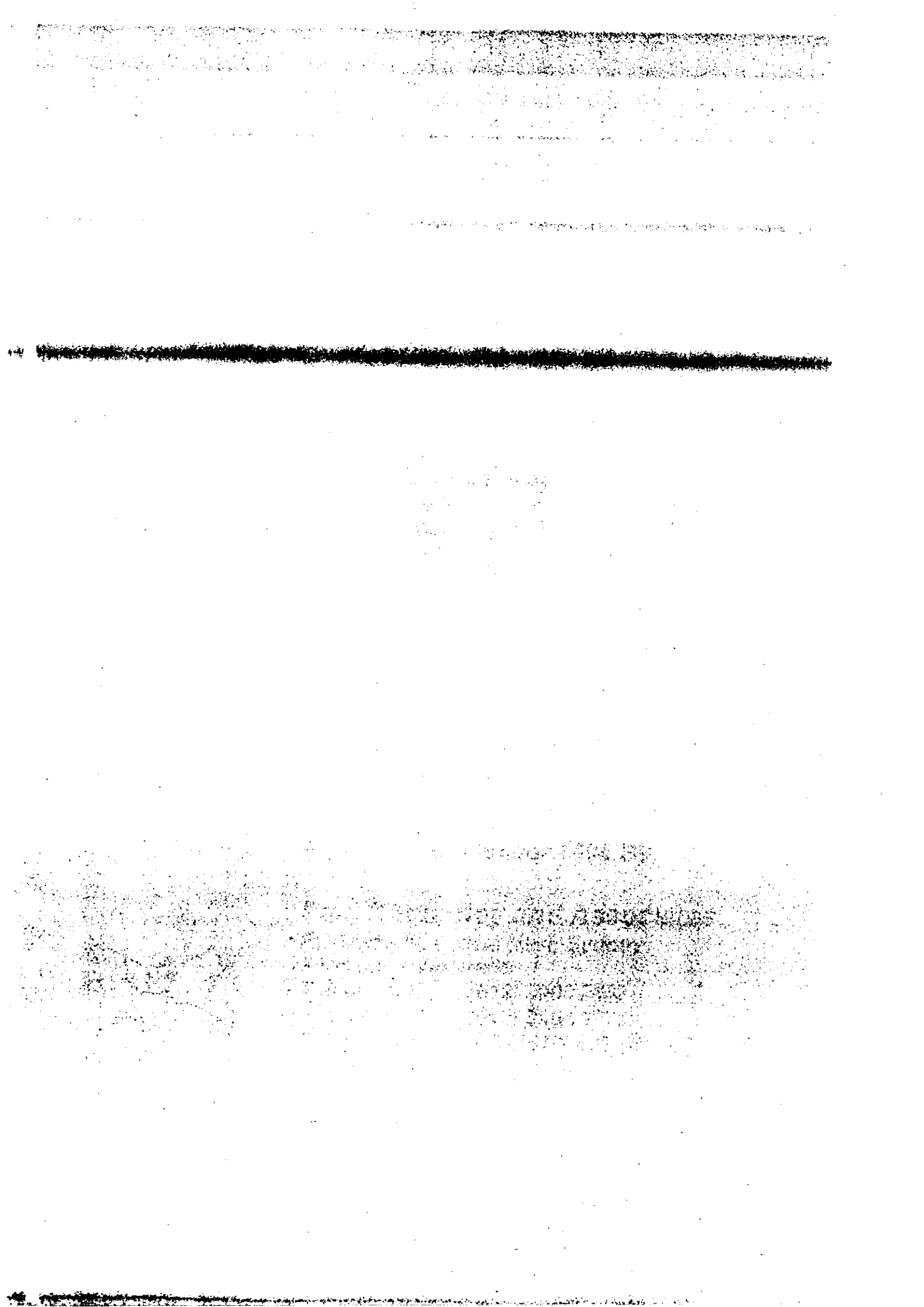

GATEWAYS AND SERVICES: A GLOBAL PERSPECTIVE

The function of this paper is to discuss what has come to be known (probably inaccurately) as the Corporate Gateway. To do so it is necessary firstly to try and define what a gateway is, in its many guises, and then to try and define what it should do, once again in its many different forms.

By reducing this functionality to individual components it may be possible to derive some consensus on what a gateway comprises, and what a particular configuration might look like for a given purpose.

The paper will then examine at a range of philosophies adopted by both hardware vendors, services vendors and, soon, telecommunications vendors.

In conclusion we will return to the topic of an EDI - specific gateway and examine the use of specialised gateways from two perspectives: expanding a user community and then facilitating access to other communities.

DEFINITIONS

Before launching into an academic discussion and then surrounding it with a limiting description, let us ask the question "why". Why do we want a gateway: what function does it perform that cannot efficiently be done in other ways? And since this paper is dedicated to EDI, why do we need an EDI gateway in particular?

The usual argument goes that EDI vendors are unable to provide the necessary interconnect, or interworking between each other's networks. Whilst this statement is now only partially true there is some validity in the argument. But does it really need an in house gateway to solve the problem - because if it does, then everybody needs one.

See Diagrams 1 and 2; The interconnect problem.

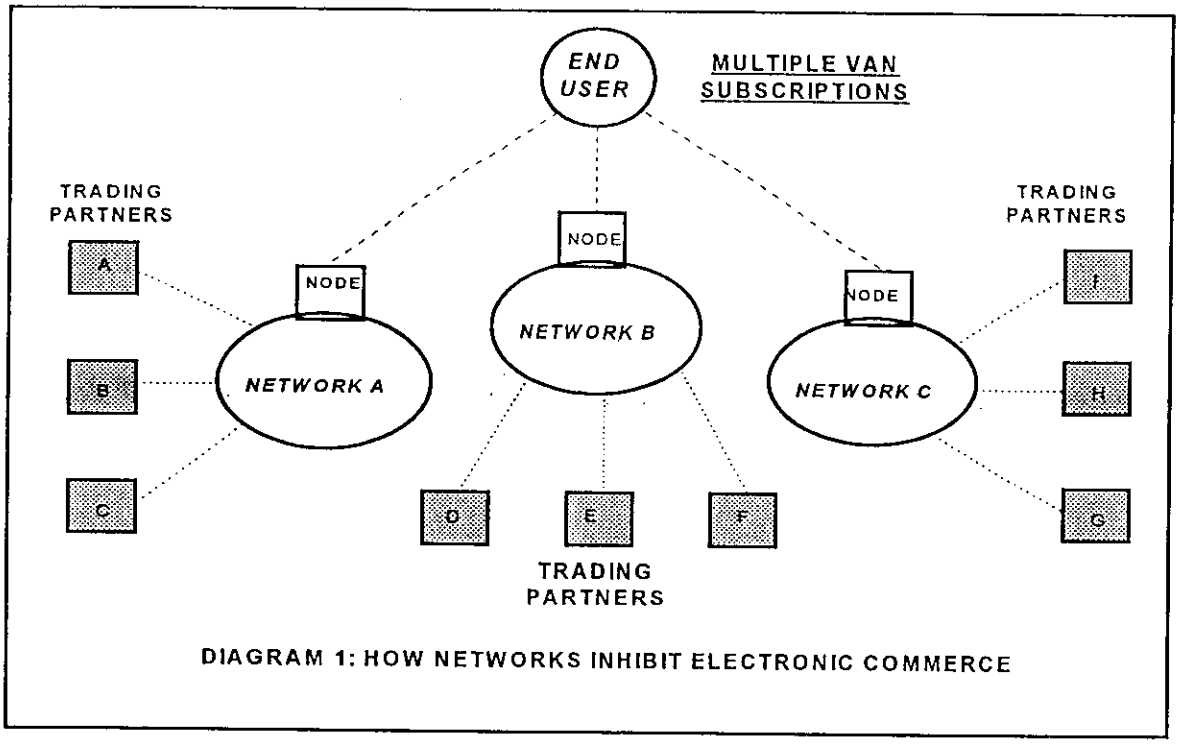

DIAGRAM 1: HOW NETWORKS INHIBIT ELECTRONIC COMMERCE

In fact, increasingly, the VANS can provide an interconnection. At least three Australian VANS provide a custom built 'pipe' between each other's services. Two also have an X.400 interconnect. However, it may be no cheaper in the long run because VANS, in general, charge for transiting their network, even if no value is added

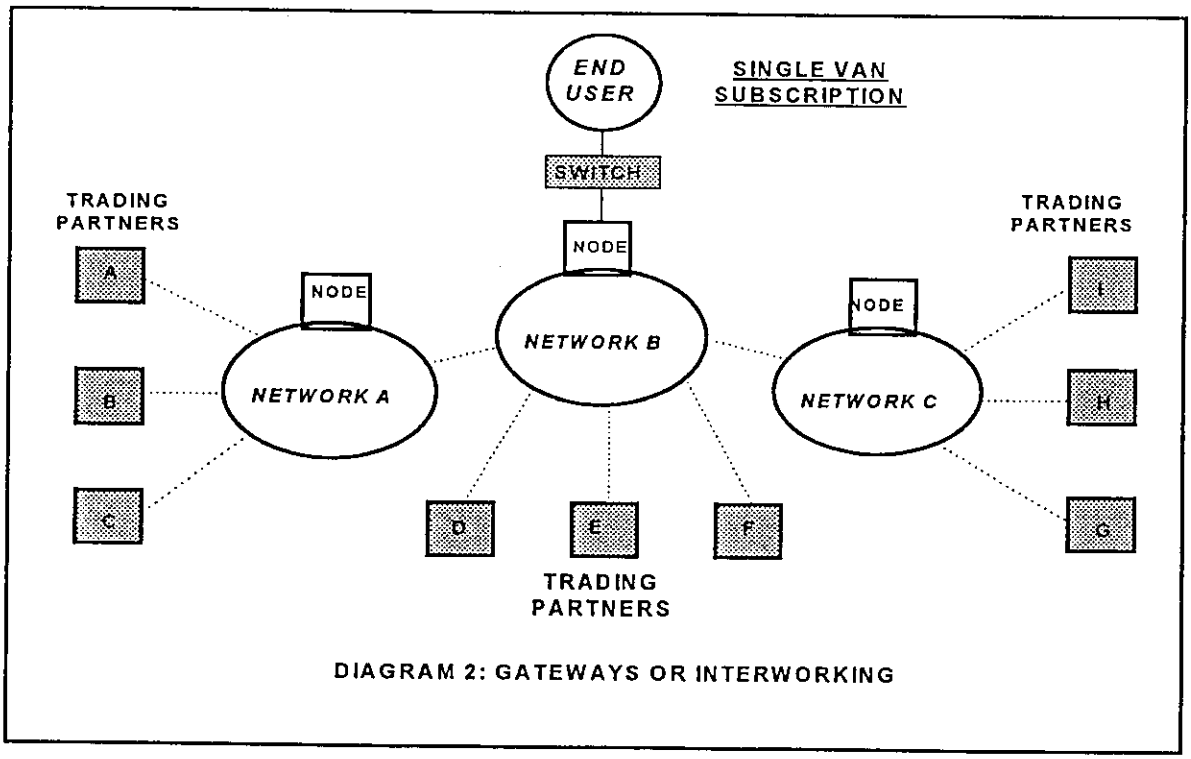

DIAGRAM 2: GATEWAYS OR INTERWORKING

A further comment here: even if some VANS do not have local interconnect agreements they may have them overseas. For example AT&T (Istel), INS (ICL/GEIS), BT and IBM have agreements in the UK and in the USA. Telecom also use Infonet (they are a shareholder) for the same purposes.

The second part of that argument goes that increasing VAN traffic and multiple mail boxes cause costs to escalate, and that by integrating an organisation's internal network into a gateway then that organisation needs only one mailbox on each appropriate VAN. Once again the argument has validity, but it does not generally reduce traffic costs, only mailbox costs. And VANS may not be willing to reduce monthly minimums anyway.

Concerning traffic (or transition) costs. If we estimate something like two (2) million EDI messages a month in total, spread across seven (7) or eight (8) VANS, i.e. including:

- NEIS
- IBM
- AT&T
- AAP-Reuter
- BT
- GEIS
- Telstra

The calculation shows a network loading of 7,000 connect hours a year (note assuming all access is via PSTN. Even direct connections are only in use for some of the time).

This equates to 3.5 hours connect time per hour of each working day (50 weeks, 5 days/week, 8 hours per day).

But this connect time is spread over 4,000-5,000 users. Even assuming Pareto rules apply, the larger users would only be connected for a few minutes each day. Hence, in all but an extremely small number of cases, the traffic cost argument does not hold.

These first two reasons are very difficult to cost justify unless it results in a p.c. switch being installed.

Most reasons for installing a gateway probably fall into two categories: and they have less to do with EDI than with overall corporate electronic communications and inter enterprise computing.

The first group of reasons, as we have already seen, is for economy; of traffic costs, of VAN usage and of mailboxes. It also has to do with duplication of corporate resources. In many cases the local EDI effort duplicates other efforts which are already going on the corporate MIS department, or in other user departments.

The next group of reasons is rationalisation: to make better (exclusive?) use of corporate communications facilities, of translation software and of EDI implementation skills and of the whole range of enabling technologies, systems and resources by combining them, and by using a gateway as the corporate political vehicle.

To add some meat to this argument: if an organisation has multiple hosts, possibly from different vendors, each performing some EDI function for their applications, then the use of a gateway for one of two purposes does appear to have a seductive logic.

One purpose could be for using the gateway as an inter-application communications device, using translation and interpretation facilities to help separate applications and systems to talk to each other.

The second is to devolve all EDI functionality to a front end (gateway) to allow a single EDI "choke point" for economies of scale.

The third, largely unspoken reason, reappears when any new technology, e.g. the switch, threatens to wrest control of a resource from an already existing department. In this case MIS will take over EDI and bundle it in with X.400 and X.500 projects, with voice, data, fax, mail and image capture and processing projects.

So that the argument about why a corporate EDI gateway becomes diffused and lost in the larger gateway issues.

These comments do not imply judgement; rather they reflect the current reality of the situation, as viewed in North America and Europe, as well in Asia and Australasia.

REQUIREMENTS

If we therefore take the broadest of current requirements, a gateway must include:

(I) An inter-network switch

(ii) A range of communications options

(iii) EDI functionality:

- (corporate) central translation
- validation and compliance checking
- trading partner enabling tables
- security facilities

(iv) Application integration capability

(v) Application development (back office) functions

(vi) Be OSI standards-based (e.g. X.400/X.500 and Unix), embrace all major EDI message standards (e.g. ANSI X12, UN/EDIFACT) and their major derivatives (VICS, EANCOM, etc)

(vii) It must have a range of administration functions, e.g. logs, audit trail, billing, reports etc.

(viii) Optionally it will support other media and other data services than just EDI. For example file transfer, mail, fax, voice, value added mail, fax and voice, and increasingly scanning and imaging applications, perhaps even audio and video conferencing.

FUNCTIONS

The basic function of and EDI gateway therefore starts with communications and switching. It needs to be able to handle access to any network or direct links with trading partners. Normally asynchronous access over a PSTN from a p.c. is the simplest means of satisfying this requirement, even if the p.c. has to act as the front end to your host processor. Providing the host processor has an operating system with p.c. support (not a given by any means), then the front end comms/switch would merely send and receive flat files from the host. Most EDI users, probably over 90% (50,000 - 60,000 world wide in 1993), are satisfied with this approach. The front end may also need to access the packet switched network (X.25) or satisfy a range of proprietary protocols. Very high volumes can justify dedicated digital services but that level of functionality is only genuinely needed by a very small number of installations. However, issues of reliability and security may override such economic issues.

The switch function can also vary in sophistication. It starts from the premise that you have your own network and wish to access more than one VAN. In all likelihood there are various departments in the organisation who are using their own mailbox: the export department for trade facilitation; the marketing department for government and commercial sales and so on. Hence, externally

the switch will log on to each VAN in turn, retrieve mailbox contents and then deliver a translated file. Internally it will embed messages with internal network addresses and deliver them to the appropriate user. Note that ANSI X12 and UN/EDIFACT message standards also have the ability to contain internal network addresses. This function is not exclusive to an application system, host or front end system.

The processing functionality of the gateway could include trading partner tables, which contain details of electronic (VAN) addresses, fax and phone numbers, EDI document types (send and receive), physical document types (paper, fax etc), message standards and standards levels, security information (encrypt/non-encrypt: key, etc). You may also wish to maintain history files on some of these fields. For example, exactly when a standards level was changed in case there are messages to/from the same partner at different levels, which are still in the system, or in case you change VANS at any time.

The gateway would also need to be able to validate a trading partner number and VAN address combination, prior to each transmission. In some countries, where EDI Post is used for true EDI, the gateway can assign a "dead letter" mailbox number to an otherwise invalid combination, for onward transmission of hard copy and fax.

If the gateway is being used as a central translator it would need to apply a separate logic stream to confirm that the translation (or interpretation) of a particular message set from a particular standards is called for. And of course it would need to support all supersets and subsets of standards (message sets) used, or likely to be used, by trading partners.

At the enhanced functionality level the gateway may act as a platform for corporate communications such as X.400 store and forward products, any mail, fax and enhanced fax, digitised voice services, etc and X.500 services. X.400 is likely to be the session protocol for EDI data transfer in the future: X.500 may become the standard vehicle for trading partner tables.

Some gateways have applications for specific functions. For example user billing, log, audit trail tracking and tracing software, statistics and so on. In one case this includes "opening" X.400 envelopes, matching and merging data and then re-enveloping.

Summarising this section we are beginning to see gateway vendors apply labels to a gateway functionality, as part of a marketing move for a more intense focus on the concept. The two tags which seem most relevant are:

(I) **The Intelligent Business Network,** comprising a virtual community of computers using a family of electronic network services. This comes via

INS out of the MIT research programme "Management in the 1990s", reference Michael Porter (Marketing; Competitive Advantage), Michael Hammer (Corporate Reengineering).

See Diagram 3.

(ii) The gateway is the **centralised platform for all electronic communications** with trading partners. This out of Unisys (also of "customerise" fame - or infamy).

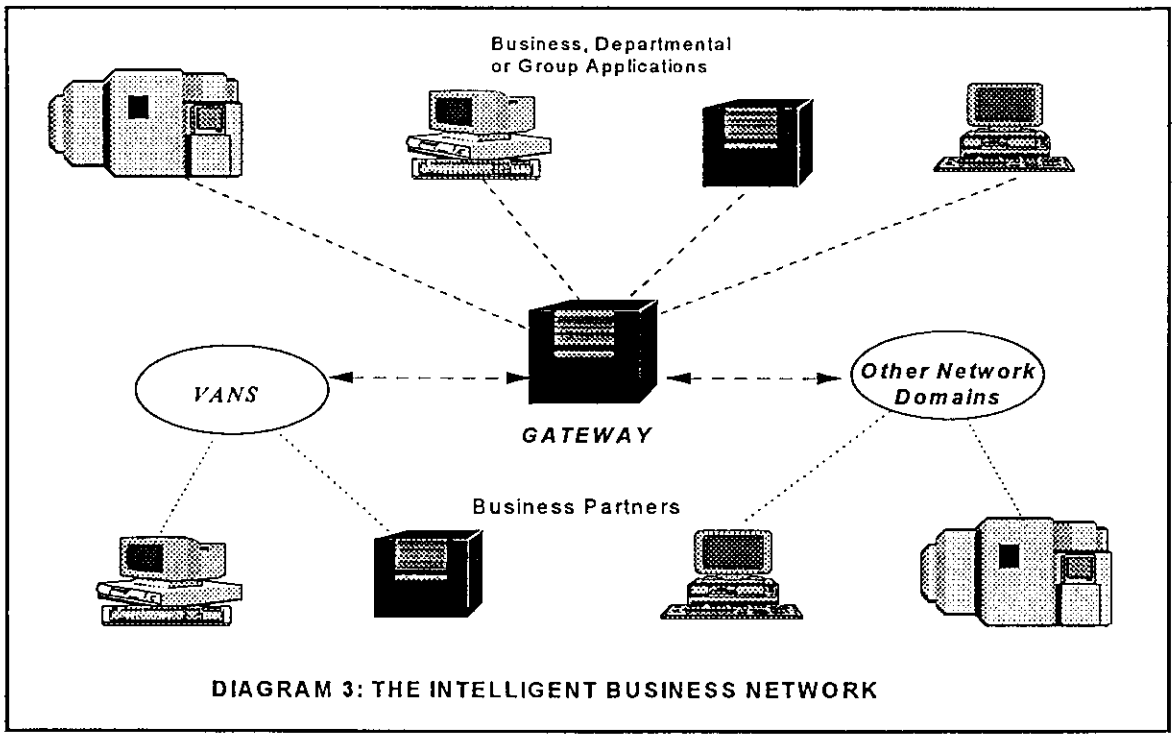

DIAGRAM 3: THE INTELLIGENT BUSINESS NETWORK

CORPORATE GATEWAY SERVICES

In general VANS are withdrawing from the provision of EDI end user services. Increasingly the corporate user, either directly or through a third party, needs to rovide support for the education function right the way through to implementation, maintenance and help desk. It may be that a particular VAN has a turnkey type of arrangement with your organisation, but if this is the case he will almost certainly only support his own products and services. And that, once again generally speaking, is not good enough. There are several good products which are VAN independent: many of the better education courses are from third parties; many ramp up or roll out programmes are offered by third parties. VANS are not the sole repository of good ideas.

VANS are in a difficult position. EDI is a very cost sensitive business to run. It is doubtful that, by 1993, any Australian VAN has yet recovered his investment

in EDI, let alone make a profit. Yet there is a trend to select, or change to a new VAN on price alone.

Economic times dictate the necessity of such decisions but the VAN who has put maybe five (5) years into education, development and community expansion for a corporation, only to lose the account on renewal to a competitor who did not make that investment deserves some sympathy.

However, for these and other reasons, the necessary level of end user support is not likely to be available for all end users in a corporation, so that he who takes on the corporate gateway approach also takes on the end user support tasks.

In this case, what are the full requirements of today's EDI gateway and services.

EDI GATEWAY AND SERVICE FUNCTIONALITY

Taking the whole like of an EDI project, bearing in mind the need to be self sufficient, fully support EDI end users and to be VAN and VAN product independent, desirable functionality includes:

(i) Pre installation

- To provide pre installation services such as cost benefit studies, EDI capability and preparedness exercises; to conduct EDI audits.
- To supply education, training and updating services.
- To conduct functionality studies on EDI software products, to validate the product for internal and external network usage.
- To provide appropriate support services for EDI trading partners outside the organisation where deemed necessary.

(ii) Installation

- Set up users. Provide integration services (and backwards integration for existing but non-integrated users). Create and maintain documentation.
  Note: This may involve removing function from a host processor, hence repair, remodelling and maybe systems reengineering may be called for.
- Set up business partners/trading relationship tables: maintain and report on them to users.
- Allocate and manage passwords: rotate and audit according to corporate policy (if there is one: if not, set one).
- Set up appropriate security procedures. Allocate keys; manage key rotation.

(iii) Production

- Set up and manage Help Desk. Make arrangements for "out of hours" working.
  Note: Your overseas EDI partners could well be as much as 18 hours out of time synch with your own organisation.
- Provide remote diagnostics and appropriate support
- Provide ongoing EDI audit and QA services
- Monitor usage and statistics
- Logs, audit trail, billing services
- Monitor security, password usage
- EDI translation standards support, levels support, integrated EDI application support and maintenance.
- Trading partner table maintenance

(iv) Ongoing Services

- Application interfaces: 'hooks' for integrating EDI with applications. Develop and maintain. Note: These are occasionally called "Applications Agents".
- Manage priority EDI streams and priority allocation. Facilitate interactive EDI processing where possible.

(v) User connectivity

In a very large enterprise or a large user community an EDI gateway needs to facilitate any end user connection. Such connectivity would include:

- PSTN
- LAN (IEEE 802.3)
- LAN variants
- X.25
- SNA and variants
- X.400/X.435
- File Transfer Protocols
- Proprietary protocols
- Input from protocol converters
- VAN connections

(vi) VAN; Community Connectivity

The EDI gateway will ultimately need to connect to other communities, including enterprises, industries, government systems, VANS and IVANS - always assuming the purity of the principle: VAN independence.

These connections would include (in addition to user connectivity options)

- Custom built VAN pipes
- X.400 domains
- Mail and fax services
- Network session protocols
- Appropriate IVAN connections
- An intercorporate (intra-industry) switch
- A national or international switch
- An inter VAN switch
- A hybrid

VENDORS

At this stage it is probable that there are three main groups of vendors who can offer the major components of a corporate EDI gateway: hardware vendors, software vendors and telcos/VANS.

Note: This does not necessarily include all of the communications options: it certainly does not include all of the translation/interpretation software options.

It is doubtful whether, at this stage, any single vendor can provide an enterprise's full requirements. The probability is that a hardware vendor would prime contract a joint venture of all three categories, this is for an installation of any size and complexity.

As an introduction to some of these vendors active on the international scene:

(I) Hardware Vendors

AT&T
DEC
IBM
ICL/Fujitsu
Sequent
Stratus
Tandem

Unisys
Unix vendors
p.c. products

(ii) Software Vendors

BT
GEIS
IBM
INS
NEIS
Novus
Telstra
Scicon
Sterling Software
Western Union (AT&T)
Udax

(iii) Telco/VANS/IVANS

AT&T
Baby Bells (eg Ameritech, Bell Atlantic, Nynex etc)
BT
GEIS
IBM
Telstra

Where an enterprise is considering a gateway there will be no alternative to the RFI/RFP route. This may not achieve the best results since many of the vendors listed either have no direct representation in Australia, or their centres of expertise are based overseas. The RFI/RFP process may just flush out a few surprises. But whatever happens do not try a do-it-yourself approach. "There be dragons!" It is slow, prone to failure, expensive and will certainly be overtaken by well specified and affordable products when you are half way through it.

See Diagram 4: The Corporate Gateway Service.

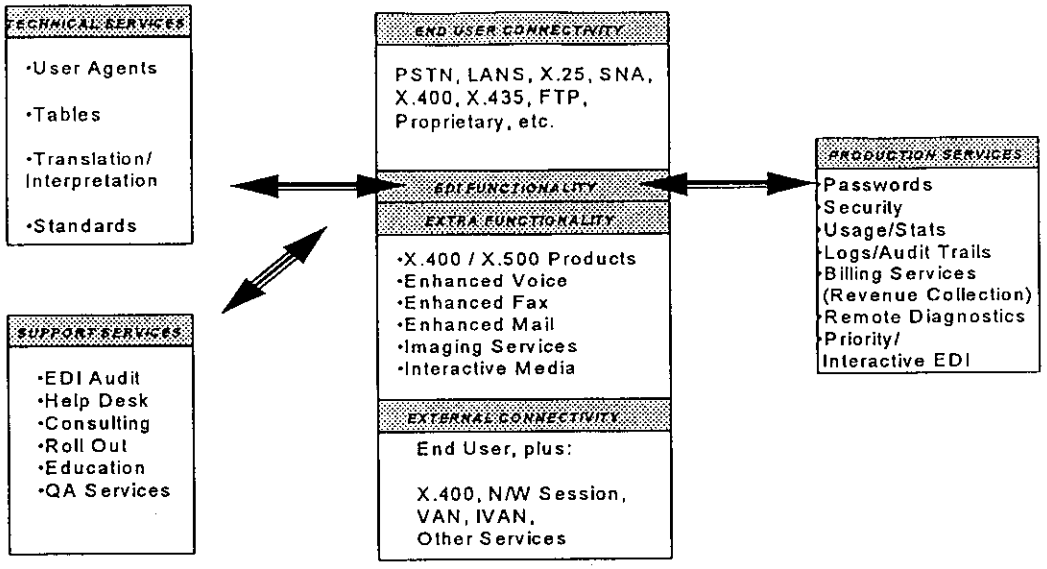

DIAGRAM 4: THE CORPORATE GATEWAY SERVICE

"Defer until the right product is available" is the best advice anyone can give in these circumstances. Just to give a couple of examples:

(I) Voice Gateways

In the 1920s someone - it may have been Bell - predicted that by around 1980 one quarter of the world's population (around 1 billion people) would need to become telephone operators if it was to keep up with demand by then. This was clearly tongue in cheek but - surprise, surprise - this actually happened. Not in the manner implied perhaps, but today everyone can dial direct, hold calls, divert calls, and perform many other functions from a single telephone handset, in effect a personal voice switch.

In a similar fashion the corporate voice switch has progressed from a manual exchange, to PABX, to automated PABX, to intelligent exchanges, to intelligent networks, to new technology centrex and soon automated intelligent network centrex services.

The switch is evolving into the network.

(ii) Data Switches

It is a similar story with data switches. They first appeared in the late 1950s in support of what we would now call Local Area Networks, by means of an in host controller. Modems and multiplexers were followed by dedicated communication controllers supporting WANs (teleprocessing). Intelligent controllers, capable of handling more than one protocol and large networks, comprised of sub-controllers, reached the market by the early 1980s. These have been followed by front end network controller hierarchies, access nodes, bridges, routers etc.

Very intelligent versions of these devices now totally insulate host processors and data base machines from the networks.

And soon, the public network may be able to perform that function in a data-centrex, intelligent VPN controller.

OTHER MEDIA

As will be seen from the final section of this paper, conventional data application to data application EDI is taking far too long to implement between enterprises. In order to reap the benefits of computer to computer communications we must become more flexible in our choice of medium in order to achieve the same purpose. Hence, in addition to EDI, we need:

EDI to fax: fax to EDI
EDI to hard copy: hard copy to EDI (print)
EDI to Telex: Telex to EDI (including use of Telex to fax services)
EDI to digital voice: digital voice to EDI
EDI to image: image to EDI

There is no time or space to detail the actual technologies here, but they are feasible. For example, there are six (6) voice technologies which are suitable in some measure. ICR (Intelligent Character Recognition) is also being used for the purpose.

X.400 offers some facilities in this area. As well as EDI and file transfer applications. It will soon support Technical Document Interchange, Voice Mail Interchange (X.440) and Image Document Interchange.

X.400 and X.500 philosophies are likely to become the keystones for integrated platforms for the exchange of all electronic business information, a la 'electronic platform' or 'intelligent business network'.

THE CHOICES

This paper has probably not helped too much on specific choices facing an organisation who is considering an EDI or corporate gateway. Nevertheless it perhaps gives an insight into a fully specified gateway of the future and a migration path from where systems currently stand. The range is enormous: from p.c. to fault - tolerant mainframe; from EDI - specific, to an EDI gateway service to a full electronic services platform.

There is no single definitive solution, as the variety of vendors in this very new market place also indicates.

Perhaps, as a guide, we could finish with a look at a few international case studies.

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There are relevant case studies in North America, in Europe and in Asia. It is assumed that the Australian examples, such as Customs, BHP, and planned initiatives at Tax, DAS and Defence are reasonably well known.

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So far there are two main US models. The first is based on economies: Dupont manages its global network (mailbox based) service with a proprietory fault tolerant application, for integrating a single mailbox into their own global network system. Most major banks have adopted similar philosophies for their dealings with NACHA and SWIFT.

Another category (e.g. Chrysler) started off a major EDI program with a corporate EDI switch, for application devolution, or insulation from departmental applications.

As a further comment, two VANS have redeveloped their public offering gateways on to fault tolerant platforms. Others have committed to, but have not necessarily installed, an X.400 platform for VAN inter working. However, the ANSI X12 mailbag message and custom pipes are still more widely used in North America, especially for the non-Telco VANS.

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A new EDI promotion campaign is growing in the UK under the aegis of a loose association of 22 EDI software houses and some of the VANS. Strong support from the ANA and a newly formalised and highly professional EDIA is smoothing the way.

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There are at least five major Asian EDI gateway initiatives at some stage of development. The most mature by far is Singapore Network Services (SNS) TradeNet project, initiated in 1987/88. It supports a now-compulsory trade facilitation project. It is based on the IBM IIN Tampa 3900 installation. It is supported by local EDI data entry service bureaux. It has recently announced its EDIFAX service. TradeNet is a domestic monopoly EDI service which connects with major IVANS and vendors, e.g. FANUC, a Japanese VAN from Fujitsu.

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The first group of reasons, as we have already seen, is for economy; of traffic costs, of VAN usage and of mailboxes. It also has to do with duplication of corporate resources. In many cases the local EDI effort duplicates other efforts which are already going on the corporate MIS department, or in other user departments.

The next group of reasons is rationalisation: to make better (exclusive?) use of corporate communications facilities, of translation software and of EDI implementation skills and of the whole range of enabling technologies, systems and resources by combining them, and by using a gateway as the corporate political vehicle.

To add some meat to this argument: if an organisation has multiple hosts, possibly from different vendors, each performing some EDI function for their applications, then the use of a gateway for one of two purposes does appear to have a seductive logic.

One purpose could be for using the gateway as an inter-application communications device, using translation and interpretation facilities to help separate applications and systems to talk to each other.

The second is to devolve all EDI functionality to a front end (gateway) to allow a single EDI "choke point" for economies of scale.

The third, largely unspoken reason, reappears when any new technology, e.g. the switch, threatens to wrest control of a resource from an already existing department. In this case MIS will take over EDI and bundle it in with X.400 and X.500 projects, with voice, data, fax, mail and image capture and processing projects.

So that the argument about why a corporate EDI gateway becomes diffused and lost in the larger gateway issues.

These comments do not imply judgement; rather they reflect the current reality of the situation, as viewed in North America and Europe, as well in Asia and Australasia.

REQUIREMENTS

If we therefore take the broadest of current requirements, a gateway must include:

(I) An inter-network switch

(ii) A range of communications options

(iii) EDI functionality:

- (corporate) central translation
- validation and compliance checking
- trading partner enabling tables
- security facilities

(iv) Application integration capability

(v) Application development (back office) functions

(vi) Be OSI standards-based (e.g. X.400/X.500 and Unix), embrace all major EDI message standards (e.g. ANSI X12, UN/EDIFACT) and their major derivatives (VICS, EANCOM, etc)

(vii) It must have a range of administration functions, e.g. logs, audit trail, billing, reports etc.

(viii) Optionally it will support other media and other data services than just EDI. For example file transfer, mail, fax, voice, value added mail, fax and voice, and increasingly scanning and imaging applications, perhaps even audio and video conferencing.

FUNCTIONS

The basic function of and EDI gateway therefore starts with communications and switching. It needs to be able to handle access to any network or direct links with trading partners. Normally asynchronous access over a PSTN from a p.c. is the simplest means of satisfying this requirement, even if the p.c. has to act as the front end to your host processor. Providing the host processor has an operating system with p.c. support (not a given by any means), then the front end comms/switch would merely send and receive flat files from the host. Most EDI users, probably over 90% (50,000 - 60,000 world wide in 1993), are satisfied with this approach. The front end may also need to access the packet switched network (X.25) or satisfy a range of proprietary protocols. Very high volumes can justify dedicated digital services but that level of functionality is only genuinely needed by a very small number of installations. However, issues of reliability and security may override such economic issues.

The switch function can also vary in sophistication. It starts from the premise that you have your own network and wish to access more than one VAN. In all likelihood there are various departments in the organisation who are using their own mailbox: the export department for trade facilitation; the marketing department for government and commercial sales and so on. Hence, externally

the switch will log on to each VAN in turn, retrieve mailbox contents and then deliver a translated file. Internally it will embed messages with internal network addresses and deliver them to the appropriate user. Note that ANSI X12 and UN/EDIFACT message standards also have the ability to contain internal network addresses. This function is not exclusive to an application system, host or front end system.

The processing functionality of the gateway could include trading partner tables, which contain details of electronic (VAN) addresses, fax and phone numbers, EDI document types (send and receive), physical document types (paper, fax etc), message standards and standards levels, security information (encrypt/non-encrypt: key, etc). You may also wish to maintain history files on some of these fields. For example, exactly when a standards level was changed in case there are messages to/from the same partner at different levels, which are still in the system, or in case you change VANS at any time.

The gateway would also need to be able to validate a trading partner number and VAN address combination, prior to each transmission. In some countries, where EDI Post is used for true EDI, the gateway can assign a "dead letter" mailbox number to an otherwise invalid combination, for onward transmission of hard copy and fax.

If the gateway is being used as a central translator it would need to apply a separate logic stream to confirm that the translation (or interpretation) of a particular message set from a particular standards is called for. And of course it would need to support all supersets and subsets of standards (message sets) used, or likely to be used, by trading partners.

At the enhanced functionality level the gateway may act as a platform for corporate communications such as X.400 store and forward products, any mail, fax and enhanced fax, digitised voice services, etc and X.500 services. X.400 is likely to be the session protocol for EDI data transfer in the future: X.500 may become the standard vehicle for trading partner tables.

Some gateways have applications for specific functions. For example user billing, log, audit trail tracking and tracing software, statistics and so on. In one case this includes "opening" X.400 envelopes, matching and merging data and then re-enveloping.

Summarising this section we are beginning to see gateway vendors apply labels to a gateway functionality, as part of a marketing move for a more intense focus on the concept. The two tags which seem most relevant are:

(I) **The Intelligent Business Network,** comprising a virtual community of computers using a family of electronic network services. This comes via

in EDI, let alone make a profit. Yet there is a trend to select, or change to a new VAN on price alone.

Economic times dictate the necessity of such decisions but the VAN who has put maybe five (5) years into education, development and community expansion for a corporation, only to lose the account on renewal to a competitor who did not make that investment deserves some sympathy.

However, for these and other reasons, the necessary level of end user support is not likely to be available for all end users in a corporation, so that he who takes on the corporate gateway approach also takes on the end user support tasks.

In this case, what are the full requirements of today's EDI gateway and services.

EDI GATEWAY AND SERVICE FUNCTIONALITY

Taking the whole like of an EDI project, bearing in mind the need to be self sufficient, fully support EDI end users and to be VAN and VAN product independent, desirable functionality includes:

(i) Pre installation

- To provide pre installation services such as cost benefit studies, EDI capability and preparedness exercises; to conduct EDI audits.
- To supply education, training and updating services.
- To conduct functionality studies on EDI software products, to validate the product for internal and external network usage.
- To provide appropriate support services for EDI trading partners outside the organisation where deemed necessary.

(ii) Installation

- Set up users. Provide integration services (and backwards integration for existing but non-integrated users). Create and maintain documentation.
  Note: This may involve removing function from a host processor, hence repair, remodelling and maybe systems reengineering may be called for.
- Set up business partners/trading relationship tables: maintain and report on them to users.
- Allocate and manage passwords: rotate and audit according to corporate policy (if there is one: if not, set one).
- Set up appropriate security procedures. Allocate keys; manage key rotation.

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The interesting aspect here was the requirement for a Community Access Service (CAS). Since well over 100,000 Hong Kong traders have just a

phone or a fax (or a telex) and only a very small proportion are able to write or speak English, the successful tenderer had to propose a method of dealing with these traders.

In the event the CAS component recently looks to have been deferred for two (2) years. But various proposals included:

- EDI service bureau for EDI input and output
- Digitised voice input and output
- Voice in/fax out (and variants)
- Telex-to fax in, fax out (and variants)
- Scanned input, hard copy output
- Intelligent Character Recognition (ICR)
- Purpose built EDI terminals (note: Hong Kong has over 20,000 TAB-type betting terminals installed)
- EFPOS input

All of these technologies can be demonstrated to varying levels of effectiveness but they still cannot overcome the problems of roll out marketing and support. Singapore did it by compulsion; perhaps that may also succeed in Taiwan and Korea - but not in Hong Kong.

Malaysia is the latest to show an interest in a National EDI Service, threatening to award a contract in the very near future.

India has just installed a small trial system; other Asian countries, including Chinese provinces, are also at varying stages of feasibility planning.

THE GATEWAY AS A ROLLOUT MEDIUM

Sears PLC (unconnected to with Sears Roebuck) are possibly the UK's largest retailer. They own many High St fashion stores, most of the footwear outlets, Selfridges, British United Shoe Corporation and many mail order companies, including Freemans.

Their problem is that of variety. Sears is a child of the boom; a composite of virtually hundreds of different companies, with varying systems, management philosophies, priorities and so on. Sears made a corporate decision to use a gateway approach to implement EDI internally and with trading partners, but by using conventional media where necessary.

They decided not to try to get everyone to change systems to adopt EDI, but to give companies a migration path.

Hence, for example, reorder cards are still contained in shoe boxes, but they are centrally scanned (some EDI/EPOS input) for supplier order processing. Supplier ordering is via EDI. They deliver EDI messages to VANS from the gateway; where their trading partners (internal or external) have a valid EDI trading partner number the messages are transmitted to their mailboxes. If they have not, then the messages are dropped into a 'dead-letter' mailbox, for retrieval by the Royal Mail EDIPOST service, for interpretation, printing or faxing and delivery.

Freemans alone (a Sears subsidiary) have the largest EDI trading partner community in the UK, mainly due to their use of a gateway and EDIPOST. They also have around 2000 conventional EDI installations through a joint venture with a translation software company who, independently of VANS, developed a Freeman's end user package.

THE MODEL FOR A GATEWAY - ROLLOUT SERVICE

And finally, taking the (Hong Kong) Tradelink CAS and Asian requirements and Sears - EDIPOST experience it is probably now possible to define what a mixed technology input/output corporate gateway service will look like. It will include all of the support and production services identified earlier in the paper, plus: A full X.400/X.500 based gateway, with comprehensive access facilitation and interconnections, plus end user facilities for:

- Input by business systems of their own gateways
- Walk in EDI bureau input
- Telex input
- Fax input
- Voice input
- EPOS input
- OCR/MICR input
- Intelligent fax input
- Intelligent character recognition input
- Custom built EDI terminal input
- Radio Frequency device input
- Cellular Data Network input

And output by conventional EDI, by hard copy and any other of the input options.

See Diagram 5: A Model EDI Bureau.

SUMMARY

We have seen that a corporate gateway may currently be impossible to define for a particular enterprise. Its facilities may be contained on a stand alone p.c. right up to a multi functional, fault tolerant, multi million dollar system and support service.

There are a few vendors but the infrastructure is still coming to terms with an immature industry.

Any decision, whether for a simple EDI switch or a full corporate communication gateway needs to be clearly based, and measured on:

- Economic reasons
- Security and reliability
- Devolution of departmental functions and the provision of a service
- Be the basis for a corporate communications platform for, either or all:
    - communications
    - EDI
    - EDI/fax/mail
    - Enhanced functionality, including X.400/X.500 products
    - New technology functionality, including voice/data/image/conferencing
    - Mobile data capture and entry, including RF and CDN systems.

But the nirvana of a corporate communications platform, or intelligent business network (or just a plain old corporate gateway) needs trading partners to be connected to make it really worthwhile. And 25 years of EDI experience has shown that technology is never the big problem. The main challenge is to rollout your EDI community to obtain a critical mass of trading partners and in house end users.

Technology will not make that happen. An effective rollout programme might. Perhaps the real decision should be "should I invest in a rollout programme", not "should I invest in a gateway".

Appendix 5: UN/EDIFACT Introduction and Overview

THE REPUBLIC OF LEBANON

TRADE EFFICIENCY PROJECT M71/WB

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TABLE OF CONTENTS

1.00 UN/EDIFACT

The following is an introduction to UN/EDIFACT; to message standards, to the standards setting process, to the organisation and to the current status of UN/EDIFACT EDI messages. It is not intended as a reference source for the technician or the specialist; rather, as a primer for the technologist and a reference source for managers and generalists.

Those in search of greater deal detail should contact UN/EDIFACT direct and/or read the UN/EDIFACT Draft Directory of current message standards.

1.10 Introduction

Incompatible (a): opposed in character, discordant, inconsistent (with).
OECD 1964

30 years ago the word "incompatible" was often associated with personal relationships and the visual and performing arts; in fact with almost anything non-technical. In our post industrial society the word has assumed an entirely new meaning.

Incompatibility between international voltage and power plugs and sockets is now a common experience. Perhaps less well known are the battles between rival products which led to compatibility between electrical domestic appliances, audio visual products and the components of information technology. For example the struggle for supremacy between Beta and VHS VCR technologies. These rival technologies were developed independently of each other and hence were incompatible. Ultimately VHS triumphed in the market place to become the world standard. A standard was necessary in this case to ensure that all devices which used VCR technologies, such as the cassette, need only be produced to a single set of specifications.

Where competition or cooperation has not evolved the rules for compatibility (or a standard), the costs of producing for each rival format make the end product, in this case a VCR, more expensive and the product less useful. Hence sales are slow, leading to poor returns for all concerned.

In the other case, where an accepted standard evolves, or is agreed by an industry, the product is cheaper, more useful to the consumer and, as a consequence, the choice to the consumer is much wider. Thereafter suppliers differentiate on quality, functionality and service – not on standards, formats or levels of compatibility.

Standards have to be agreed for virtually everything we buy, not just appliances but consumable items, such as food, footwear, clothing and so on. The same has become true of information technology (I.T.).

For 30 years as more I.T. vendors created and protected their own markets based on proprietary hardware and software, on unique operating systems and communications protocols. Indeed a major selling point for the industry leaders was their "de facto" standards.

The explosion in information technology takeup over the last 10 years has been almost entirely due to the interchangeability or compatibility between hardware, software and communications. Over 25 million users could not access the Internet without a very considerable body of international agreements on the supporting technologies. Over the same period 100 million personal computers have been installed using compatible hardware and software.

A 'standards industry' has been evolving; committees have been set up to negotiate acceptable standards for every imaginable product or service which requires compatibility for full market acceptance.

UN/EDIFACT (United Nations EDI For Administration Commerce and Transport) is the international organisation which addresses the process of agreeing standards for business messages which are exchanged directly between computers and between organisations by means of electronic data interchange (EDI). EDIFACT facilitates the removal of paper and fosters the substitution of electronic based processes between entities involved in international and domestic trade.

1.20 Which Standard: Your Standard, My Standard?

Generally speaking larger corporates and government departments have already set their own internal standards. Database systems define the information to be exchanged; programs manipulate that information and present reports to users in a corporate standard layout by means of hard copy or screens. Incompatibilities occur between computer systems as corporates acquire other companies who already have their own differing internal standards, and between government departments who operate independently of each other. No matter how large the organisation may be, the standards that they have developed for information interchange are still unique to that corporation. In messaging applications these have come to be known as ***private standards***.

About 30 years ago corporates and government departments began to reach out to their suppliers and clients in an effort to impose their own standards (or agree common formats), in order to reduce the costs and time involved in data entry, error correction and paper handling, which influenced their reaction speed and potential economies. Clearly there were also strategic marketing and supply

chain issues involved at the same time. As these intercorporate systems began to adopt EDI technologies and to embrace the wider industry rather than just a few key trading partners, industry wide information exchange initiatives evolved. This gave rise to ***industry standards***.

A small number of the industry message standards of the time applied to global industries, most particularly to air transport and banking. Even today these global industry standards are only accessible to specific members of that industry, although efforts are being made to broaden eligibility for use. Nevertheless these type of standards can still be more properly described as ***closed user group standards***, such as S.W.I.F.T. for the banking industry and SITA for the air transport industry. True industry standards are accessible to all participants in an industry. End users can still not access SWIFT and SITA from their own systems, although this will, in time, come about.

Industries cannot exist in isolation from other industries. For example, supermarkets obtain around 80% (by value) of their purchases from industry suppliers; the other 20% is spent with non-industry specific supplies such as construction and maintenance, vehicles, information technology, banks, financial institutions, insurance companies and the like. They also have to exchange information with labour unions, taxation and regulatory authorities and industry bodies. All industries have similar information exchange problems.

This has led to a movement towards cross-industry, or ***national standards***. So far, the leaders in national standard setting have included the USA with ANSI X12 (American National Standards Institution, Accredited Sub Committee (X) 12), and the United Kingdom. The UK developed a retail industry standard called trade Tradacoms which evolved into a national cross-industry standard during the 1980s. With the possible exception of France no other country has embarked upon setting national standards for cross-industry trading, for a number of reasons.

These reasons vary but notably include: cost, leadership, technology infrastructure (and therefore the need) and in some countries, such as Japan and Korea, business culture. In this latter case Japan and Korea operate under similar business cultures which is aimed at locking suppliers exclusively into an industry or supplier-specific supply chain to the exclusion of their competitors. This trading system (Keiretsu and Chaebol-centric) is at odds with the principles of EDI and standards setting.

These ideals include cooperative standards development in order to upgrade a whole industry's ability to compete. Proponents argue that you cannot steer only part of a ship. The Australian rail system, where some states have incompatible gauges with those other states is a classic example of the penalties for non-standardisation.

Corporates, industries, countries and regions which are committed to private standards as a means of excluding competition or raising barriers to entry have actually constructed electronic barriers to trade which locks themselves in as well as excluding competitors. In so doing they are creating a double problem for themselves: they will undoubtedly have to remove these barriers with, in some cases, substantial cost and time penalties. They will also have to invest in rejoining the world trading community systems based on agreed standards.

These reasons apart, the major motive for deferral of agreeing national standards has been the undoubted success of the international standards movement under the aegis of the United Nations.

Most countries now have, or are in the process of adopting UN/EDIFACT as both their national and the international standard. The more important trade is to a country or region, the more important to them are international standards or UN/EDIFACT.

1.30 Message Standards

Electronic Commerce is a series of techniques which involve electronic delivery and receipt of information. The term embraces electronic mail, information services, electronic forms and work flow automation products, data bases and bulletin boards – and their multimedia enhancements. Most notably it includes electronic data interchange, or EDI. EDI is the 'senior' technique in electronic commerce, involving specific business information transfer from computer application to computer application. There is no human interaction in the process; it operates independently of time, distance and proprietary protocols, using electronic communications and (generally) electronic mail boxes. Third party operators known as Value Added Networks (VANS) carry the majority of EDI traffic, both locally and internationally.

The specific standards covered by the EDIFACT process embrace all structured messages deployed in the trade, transportation and administration process. Conceptually, this includes all of the information contained on paper documents used in current processes. However, it is important to emphasise that EDI does not envisage a substitution of electronics for paper forms, nor of automating current processes: this is merely the starting point for the proper application of EDI.

For any message standards setting exercise there is a common objective: to facilitate the rapid movement of data from computer application to computer application, reliably and with predictability. A more sophisticated aim may include moving only the minimum amount of data necessary for this purpose. It is implied that this exercise is a prerequisite for software package development which are able to deploy the standards in commonly used applications. Hence, when standards have been approved and tested they are handed over to software

developers (in paper or electronic media formats). The developers then integrate the standard messages into their existing translation software packages, or develop more appropriate software.

Any structured message (e.g. a purchase order, invoice, etc) which is exchanged between trading partners can be broken down into four categories of information:

(I) Administration Data: identification of parties involved in the transaction, names, addresses, codes, etc.

(ii) Transaction Data: specific buy/sell information, products/services, quantities, codes, etc.

(iii) Financial information: values, payment terms, discounts, etc.

(iv) Regulatory/Mandatory Data: tax identification, taxation type and amount, company registration details, tax year date, etc.

Every type of standards setting exercise, be they at private, industry, national or international level, needs to agree on the information content and on the rules for exchange of each message type. Note: at an industry level, e.g. the retail industry, it is assumed that the message, such as an invoice, is industry-specific. Therefore it contains information which is designed only for that industry. At the international level that invoice is a generic message, including all of the information exchanged for any invoice type, for all industries.

There are a number of sequential steps in the standards setting process:

(I) Agree Data Content:

- Identify all messages exchanged between partners in a trading community.
- Allocate titles and functional descriptions to each message type.
- Identify each individual specific piece, or field of data (data element) contained within each message type.

(ii) Syntax:

- To agree the rules of layout, and grammar for identification.
- To compile a data dictionary for all data elements, and all variations.
- To identify all usages of data elements.

- To define frequency of usage.

- To agree a unique identifier for each data element contained in the data dictionary.

- To agree and define a single, common standard data element for all future usage, for all variations.

- To document any exceptions and all rules for use.

- To identify all codes and standard tables used in the messages under consideration.

(iii) Interchange:

- To agree the character set to be used in the electronic exchange of messages.

- To agree electronic addressing conventions, headers, trailers and separators for identification of message and data element types, and any component of a file of messages which may be exchanged.

- To agree where data elements are required (mandatory) or where they may be optional, or conditional (e.g. may modify following information).

- To agree rules for exchange, logic and exceptions, where possible.

Once started, message standards setting becomes a continuous process. Rules for updating messages, for release to software developers and other standard bodies need to be agreed. Quality assurance processes, media and distribution, training and publicity all need to be provided.

The factors which distinguish international standards e.g. UN/EDIFACT, from national and industry standards are therefore:

- The geographic scope and application breadth of the process.

- An inter-industry rather than an intra-industry (and international rather than an intra-national) approach.

- The support of all national governments, national standards associations and international agencies involved in the trade process.

This mandate, also defines UN/EDIFACT's latent weaknesses, which include:

- The magnitude of UN/EDIFACT's scope means that only powerful and wealthy corporations and industries can afford active participation in the process. Smaller industries, countries and SME's (Small and Medium Enterprises) have to depend upon these participants to represent their best interests.

- UN/EDIFACT concentrates on messages and message content. There is no formal process for critically evaluating the genuine business need for that message or that specific information, nor for messages which may be eliminated, subsumed or even added to by the electronic commerce process, particularly following reengineering. Many say that the need for a 'best practise' component of UN/EDIFACT work needs to be added. Others argue the case for this work to be undertaken by a separate agency.

- International messages are, by definition, all-inclusive. The UK retail industry evaluated the UN/EDIFACT Purchase Order Message as a substitute for their Tradacoms purchase order. The EDIFACT purchase order contained over 200 data elements; the retail industry in the UK needed less than 10% of these. This perceived 'overengineering' for specific industries is leading to the development of industry subsets of EDIFACT. In the case of the European retail industry this has led to the development of the EANCOM (European Article Numbering Communications) EDIFACT subset of message standards. They use EDIFACT data elements, data dictionary, code sets and syntax but they have specifically structured messages for their industry. The EANCOM software is now designed to handle these much shorter messages which leads to the better use of information technology resources and faster processing.

  EANCOM is expected to be a model for other industries.

- The specific use of EDIFACT messages for an application is defined within documents called 'Implementation Guidelines'. Whilst not normally the province of UN/EDIFACT, local implementation guidelines are proving to be incompatible with overseas implementations in many international applications. This might not be important in closed user groups but where messages have to be exchanged between industries or between global trading partners this is proving to be counter productive. This is particularly true for the import/export, customs and transportation processes.

2.00 THE COMPONENTS OF EDIFACT

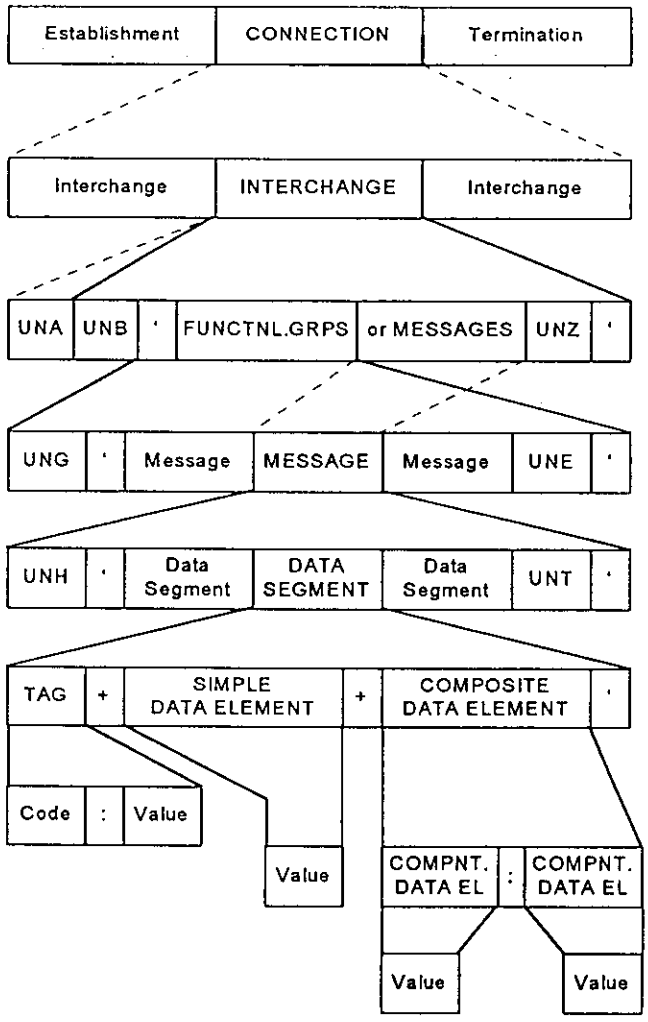
UN/EDIFACT uses its own terminology to describe the components of the EDIFACT reference model.

See Diagram 1: The UN/EDIFACT Standard Reference Model (ISO 9735).

See Diagram 2: A UN/EDIFACT Message Branching Diagram:

In effect, these two illustrations are different methods of illustrating the same information. The structure and method is generally preferred in North America, whereas Europeans generally seem to prefer the Branching Diagram method.

UN/EDIFACT publications provide further detailed information on all topics mentioned in this overview.



A CONNECTION contains one or more inter-changes. The technical protocols for establishment, maintenance and termination etc are not part of this stndrd

An INTERCHANGE contains:
- UNA, if used
- UNB, Int'ch. Hdr.
- Funct. Groups if used or only Msges
- UNZ, Int'ch. Trlr

A FUNCT. GRP contains:
- UNG, Funct.Gr Hdr.
- Msgs of the same type
- UNE, Funct. Group trailer

A MESSAGE contains:
- UNH, Message Hdr.
- Data Segments
- UNT, Message Trlr

A SEGMENT contains:
- A segment tag
- Simple data elems, or
- Composite data elems. or both

A SEGMENT TAG contains:
- A seg.code and if explicit indic., rep/nest value(s)

A SIMPLE DATA ELEM. contains a single value

A COMPOSITE D. ELEM contains composite data elems.

A COMPONENT DATA ELEM contains a single value

The EDIFACT Structure (ISO 9735)

Diagram 1: The UN/EDIFACT Standard Reference Model (ISO 9735)

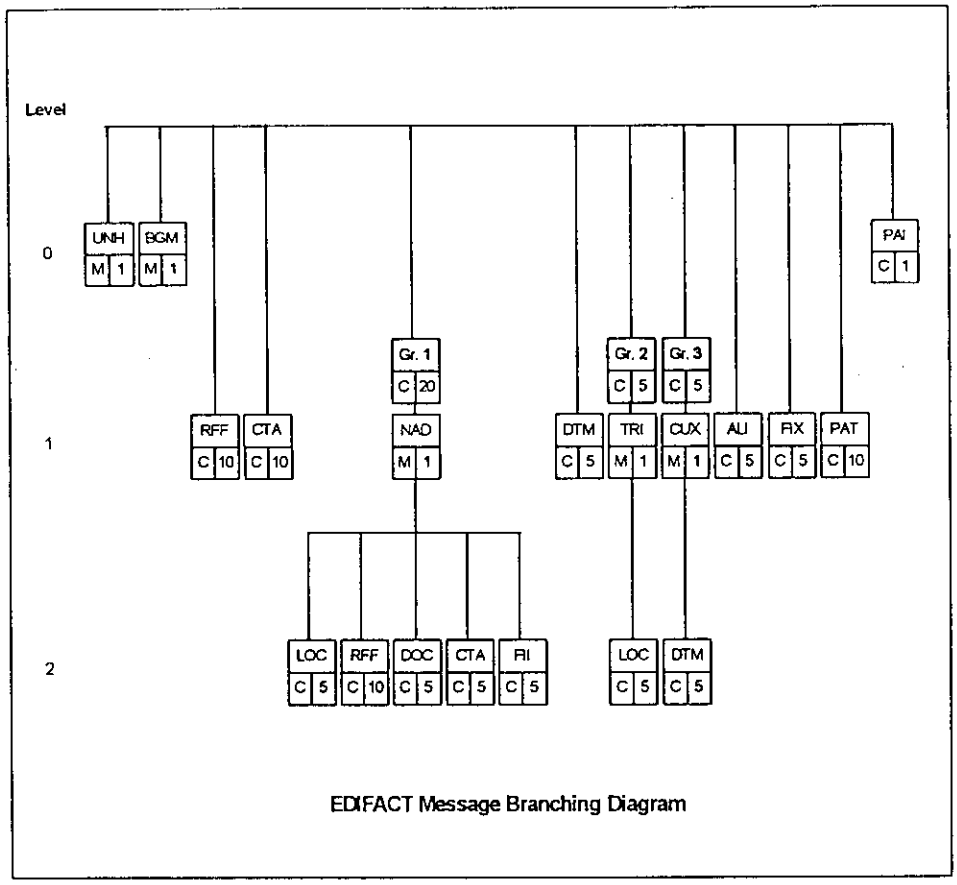


Diagram 2: A UN/EDIFACT Branching Model

2.10 The UN/EDIFACT Reference Model

UN/EDIFACT EDI standards articulate the rules defining the exchange and interpretation of data between systems. The standards have also been designed to achieve machine and communication media independence. Thereby it is possible to create and transfer a structured message in accordance with the standard in any machine environment and over any type of supporting communications function, which could be anything from physical media transfer (disk or magnetic tape) to the use of a Value Added (VAN) Network service.

UN/EDIFACT (ISO 9735) describes the standard reference model.

EDI message exchange is represented in EDIFACT by the concept of an interchange. This is the structure containing messages and subsequent data elements. An interchange is an hierarchical structure which uses segments to separate its various levels. There are two types of segment, defined as Service Segments and User Data Segments. Service Segments are always transmitted because they identify the boundaries between various levels. User Data Segments are those contained within the messages; they carry the user data. All

The data are interchanged in messages structured according to predefined formats agreed by the EDIFACT process. The work of the EDIFACT organisation focuses on the design of such predefined message structures.

EDIFACT syntax has the following characters:

- hierarchical structuring
- implicit data element identification
- special character data separation
- flexible length data structures
- mandatory or conditional status of data elements and segments

The syntax defines *interchange and functional group* as syntactic components for the identification, addressing/routing and control of the data, i.e. *messages*. These functions are mainly used by EDI software and communication services. From the user application perspective, the main syntactic component is the message.

The syntactic components in UN/EDIFACT

- interchange
- functional group
- message
- segment group
- segment
- composite data element (composite)
- (simple) data element
- data value
- character; separator.

Messages are structured by means of segments, i.e. standard building blocks, and *groups of segments*. The segments are, in their turn, built from *composites* and simple *data elements*, and the composites are built from data elements. The data elements are represented in interchange by *data values*.

The syntax offer basic (default) choices for character set, separators and representation of characters. User groups may make other choices. See appendix for details.

The syntax also specifies some components designated to have a special syntactic meaning to control interchanges of data. They are

- service messages (many still under developed);
- service segments;
- service composite data elements;
- service data elements; and
- separators for data elements, composite data elements and segments.

- **Fourth digit**
  - even for text form of data element;
  - odd ("even+1") for the coded form of data element.

Names and descriptions are expressed in natural language. The working language of EDIFACT is normally English but, through various international and national initiatives, data element directories are published in several languages. The tag is the key in cross referencing language versions.

The notation for data types is "a" for alphabetic, "n" for numeric and "an" for alphanumeric. The data element may be of fixed or variable length. For fixed-length data elements the length is given immediately after the data type. A variable data element length is indicated by two dots after the data type, immediately followed by the maximum length indication.

Data Element Examples

3039	Party id identification (tag)
Desc:	Code identifying a party involved in a transaction (description)
Repr:	an..17 (represented by alpha numeric, up to 17 characters)

3042	Street and number/p.o. box
Desc:	Street and number in plain language, or Post Office Box No.
Repr:	an..35

3055	Code list responsible agency, coded
Desc:	Code identifying the agency responsible for a code list.
Repr:	an..3

Excerpt from the data elements directory, EDIFACT trial directory set 91.1

Some general guiding principles are used to standardise data element lengths, for example

- data elements in coded form are designated an..3;
- data elements for plain language are given a format of either an..17, an..35 or an..70.

2.32 Data Element Values

A data element value is a specific entry of an identified data element, represented in a data element directory. Depending on the form of the data element the value is expressed as plain text or code.

In a few instances specific structures may be defined for data element values, e.g. for dates to be expressed as YYMMDD (year, month, day).

2.40 Code Lists

A code list is a set of code values with defined meanings, designated to a particular data element.

3055 Code list responsible agency, coded
Desc: Code identifying the agency responsible for a code list.
Repr: an..3

5	ISO (International Organisation for Standardisation) Self explanatory.
6	UN/ECE (United Nations – Economic Commission for Europe) Self explanatory.
7	CEFIC (Conseil European des Federations de l'Industrie Chimique) EDI project for chemical industry.
8	EDIFICE EDI Forum for companies with Interest in Computing and Electronics (EDI project for EDP/ADP sector).
9	EAN (International Article Numbering association) Self explanatory.
10	ODETTE Organisation for Data Exchange through Tele Transmission in Europe (European automotive industry project).

Code values for data element 3055 Code list responsible agency, coded
Excerpt from EDIFACT trial directory set 91.1

Depending on the source, EDIFACT code lists are divided into four categories, or classes.

1 Code lists for service data elements, maintained jointly by ISO and EDIFACT;
2 Code lists for user data elements, maintained by EDIFACT;
3 International code lists for user data elements, maintained by ISO or UN/ECE;
4 Code lists maintained by parties other than EDIFACT, ISO or UN/ECE.

Code lists of classes 1 and 2 are published in the UN Code Lists Directory.
Class 3 code lists are referred to in the UN Code Lists Directory.

2.41 The Use of Alternative Code Lists

For some data elements only one code list is specified, but in most cases more than one code list may potentially be used. In such instances the users may agree in the interchange agreement to restrict their use to one single code list. Alternatively, the code list can be identified by specifying the two data elements in association with the code value.

1113 Code list qualifier and
3055 Code list responsible agency, coded

2.50 Composite Data Elements (Composites)

A composite data element is a standard structure of two or more data elements. In EDIFACT, a composite data element is specified through

- a tag, i.e. an identifier for the composite data element, unique in the directory;
- a name;
- a description;
- a specification of content, i.e. two or more data elements where
  - the data elements are taken from the EDIFACT Data Elements Directory;
  - the sequence of the data elements is significant;
  - each element has a designated status within the composite.

2.51 Conventions for the Specification of Composite Data Elements

The tag of a composite data element is composed of four characters.

- **First character:**
  - S for service composites;
  - C for user composites;

- **Second to fourth characters:**
  - three digits (0-9), no particular meaning implied.

The status of the data elements of a composite is

- M for mandatory data elements; and
- C for conditional data elements.

- *clarification of usage* for each segment and segment group in the message.

Approved messages are published in EDIFACT Standards Directories, while messages accepted for trial are published in Draft directories.

Each segment position has a unique function. the data for this function is carried in a defined type of segment. To further structure a message, segments can be grouped.

Segment group 4:
NAD-DTM-FII-SG5-SG6-SG7-SG8
A group of segments for giving the details of a party.

NAD, Name and address
A segment for identifying the party identification code and the corresponding function, name and address. The party identification code is mandatory, and the structured address form is preferred.

DTM, Date/time/period
A segment specifying the date and the time details relevant to the party information identified in the NAD segment.

FII, Financial institution information
A segment identifying the financial institution, (e.g. bank) and relevant account numbers for the party identified in the NAD segment.

Segment group 5: LOC-DTM
A group of segments for giving locations and dates relevant to party.

LOC, Place/location identification
A segment specifying the locations relevant to the party identified in the NAD segment, e.g. internal building number on a site.

DTM, Date/time/period
A segment specifying dates and times relevant to the LOC segment.

segment clarification (excerpt). Message PARTIN, EDIFACT trial directory set 91.1

2.81 Conventions for Specification of Messages

The identifying code of the message is alphabetic, six characters of length.

The status of the segments and segment groups of a message is

- M for mandatory usage; and
- C for conditional.

For a segment in a group inside another group, the status (M or C) is conditioned by the status of the parent group.

LOC Letter of crEC/EDIt. See **ELC**.

log (logging) The act of centrally recording transactions by the systems management function of an EC/EDI service.

log on To connect to an EC/EDI service by dialling the access number, entering user ID and password, and then being authenticated as a valid user of the system by the EC/EDI server. After a correct log-on, the system is likely to respond with a menu or choice of required actions. Also called *sign on*.

M

MAC Message authentication code. See **message authentication**.

MAF A generic term for Ministry of Agriculture and Fisheries.

mailbox A repository for messages in an electronic mail system or EC/EDI server. Only authorized messages are allowed into mailboxes. The EC/EDI server authenticates each message before depositing the message in the appropriate "pigeonhole" of a mailbox.

mainframe/mini/micro Generic names given according to size or power of a computer. There is no longer any hard and fast rule to determine which is which. One rule of thumb is that a mainframe requires air conditioning and a micro is a PC. Hence everything in between is a mini. Power, measured in millions of instructions per second (mips) is no longer a reliable measure. A better indicator is the type of network servicing the computer, which varies from a full national network under proprietary protocols, to **wide area networks** (WANS) (still geographically restricted, generally to a few thousand feet radius), to **local area networks** (LANS), which are limited to a specific group of desks or offices. Perhaps the most reliable differentiation is the functionality of the operating system.

maintenance agency The accrEC/EDIted standards organization or committee responsible for processing requests for changes or additions to messages, segments, and data elements and procedures. The process is a standard procedure, especially within EC/EDIFACT.

maintenance procedure The authorized process mechanism for requests for changes or additions to EC/EDI messages, data segments, or data elements and related procedures (EC/EDIFACT).

MAN Metropolitan area network; a communication network spanning an approximate 50-km diameter.

mandatory A statement that a data segment, data element, or component element must be used. Used in all translation processes (see **conditional**).

many to many Applied to an EC/EDI network in which many users may talk to many others; leads to **anarchy** without a clearinghouse.

media Storage devices such as tapes (paper or magnetic), floppy disks, disks, even paper.

medium exchange The process of electronic data interchange whereby the data is contained on files (tape or floppy disk normally) and delivered to another trading partner (say by courier) on a regular basis.

Merchant Servers The Internet host (or virtual host) that provides business to consumer and business to business electronic commerce services, across the Internet. It may also be integrated with call centres, fulfilment and distribution centres, payment services, track and trace services and data warehousing services to provide a full electronic commerce service for traders and trader information.

Mercury Communications (Owned by C&W). The deregulated British carrier, set up to compete with British Telecom (**BT**).

message Generally unstructured text, but an EC/EDI document also qualifies as a message. Messaging is a generic term for the electronic mail family of services. Also, an ordered series of characters intended to convey information (ISO 2382/16). In EC/EDIFACT, a set of segments in the order specified in a message directory starting with the message header and ending with the message trailer.

message authentication The process involving encryption. Ensures that only authorized originators and recipients exchange messages.

message code A unique reference identifying a message type in EC/EDIFACT.

message directory Directory of standard messages. All standards use these and data dictionaries. Also, a listing of identified, named, described, and specified message types.

message handling services (MHS) The generic term applied to the X.400-facilitated services currently being planned (already implemented in some countries).

message header segment Service segment starting and uniquely identifying a message in EC/EDIFACT.

message standard The sequence, attributes, and usage of data elements within a message. Used in all document standards and in **SITA; SWIFT;** etc.

nesting A technique of locating a segment or segments in a precise hierarchical position with respect to another segment. Used in programming and standards setting.

nesting identifier Number used to explicitly identify level and sequence of the repeat of a data segment in a nested relationship.

nesting level The position of a segment in a nested relationship.

network A physical structure of telecommunication access paths (circuits between different end users). A network may be point-to-point, i.e., a fixed line between two access points, thus forcing data to take prescribed paths. It may be a switched network, where computers in the network calculate the optimum data path. It may also be an intelligent (software-defined) network, capable of the functions of a switched network, of integrating various other networks and computers, and of optimizing pathways, times, and costs. It may also be a packet switched network, where data is assembled into packets (which may be a collection of data from various sources). The nodes in this case are PADS (packet assembly and disassembly switches), which control the connect switches and the correct sequence and routings of data packets in a software-defined network.

network management The overall supervision of the equipment and the performance of a network.

NIST U.S. National Institute of Standards and Technology, supersedes NBS.

Nixdorf A West German computer manufacturer.

node An access point in a network. See **PAD**.

NPSI An IBM proprietary product, network processor systems interface. Enables SNA to communicate with a public packet switched network.

NSA National Security Administration (USA). Involved in setting/ enforcing data encryption standards. ANSI committee X9.9 is now taking over the responsibility for encryption standards for public systems while NSA concentrates upon military needs. **DES** was originally overseen by the US National Bureau of Standards. See **Data Encryption Standard**.

numeric character set A character set that contains digits and may contain control and special characters but no letters (ISO 2382/4).

O

octet A unit of storage comprising 8 bits. Packets of data can be switched in octet units.

ODETTE Organization for Data by Telegraphic Transfer within Europe. The original French has it: Organisation du Donnees Echanges par Teletransmission en Europe. ODETTE was formed to implement EC/EDI in the European auto industry.

omission Exclusion of conditional units of data prescribed in a message type when used in an actual application.

one to many Applied to a system in which a hub or central company connects to a range of trading partners, who do not in turn trade with anyone else within that network. See **hub, broadcast, honeypot**.

one to one Applied to a point-to-point relationship, in a network, involving two trading partners.

on line Applied to a terminal or computer actively connected to a computer, either directly or through a network.

open-routed network A switched network that has already set up the send-to-receive pathway, or a network between those points that is permanently open.

operating system The "brain" software which controls computer operations, input/output, data management, and resource scheduling.

ORDCHG An EC/EDIFACT message. Purchase order change.

ORDERS An EC/EDIFACT message. Purchase order message.

ORDRSP An EC/EDIFACT message. Purchase order response.

OSI Open Systems Interconnection. A general-purpose standard architecture leading to application-to-application communication.

P

packet A sequence of data structured to a format defined by CCITT X.25 recommendations.

packet switching Switching by using **PAD** units to assemble data into packets, switch packets over a circuit completed merely for the duration of the call (during which packets of data are transmitted to the next node in the network), and disassemble the packets. X.25 is the CCITT recommendation which covers packet switching.

PAD Packet assembly and disassembly. See **network, packet switching**.

paperless payment See **EFT; EFTPOS**.

paperless trading **EC/EDI**, the process of exchanging trading documents electronically. Supported by messaging and various other electronic network services.

parallel processing The use of several processors within a single computer system to facilitate **fault-tolerant** processing. Occasionally called nonstop processing.

parallel running The simultaneous use of two systems (paper and electronic), to enable one to check the other.

parity checking An error checking technique used in programming and data communication to ensure receipt of complete and valid data.

partner to partner relationship The new electronic (paperless) trading relationship between trading partners in an EC/EDI network.

passthrough Access of data to a network by travelling across another network via gateways.

password A unique, generally six-digit, word which identifies a specific EC/EDI end user to the system. A user ID, system validation, and authentication must also be satisfactorily entered and processed and then accepted by the system before messages can be sent or received. The messages themselves are subject to compliance checking.

payment instruments Checks, **EFT, EFTPOS**, credit/debit notes, credit memos, letters of credit, etc. **Value exchange** is the generic term for this process of replacing money with new technology tokens.

payment terms In the EC/EDI context, the time delay between the acceptance of a valid (electronic) delivery document and the specific time/data at which money is received in the trading partner's account. Not the traditional payment terms, e.g., 7, 14, or 28 days net. Because of the benefits of electronic trading, this period may be reduced to a few days instead of the accumulation of: (1) time to enter and approve an invoice; (2) normal payment delay; and (3) delay between payment approval and funds receipt. In the future this process will involve principles such as unchecked receipt of goods (i.e., **assumed receipt**) and elimination of invoices.

PC Personal computer.

PCB Printed circuit board (card). Often shown in lowercase, i.e., pcb.
PE UK Customs period entry declaration data entry service.

Pedi A mnemonic for the committee work under way to integrate EC/EDI requirements into X.400 standards.

Performance Standards An agreed set of standards or measurements against which a supplier's performance may be measured. It may include price, time, quality standards and a range of specific deliverables, pre agreed by both parties.

pilot systems An EC/EDI system in the initial testing phase, performed by perhaps just two trading partners. Pilot tests are utilized to check connectivity, document standards, speed, and internal systems.

pixel An individual dot, which can be in eight levels of halftone, which goes to make up a screen-based character or a scanned image on a laser printer or fax.

PNA See **ANA, EAN.**

point to point See **network; one to one.**

polling A communication control procedure by which a computer periodically interrogates nodes in the network, or terminals, to establish if they wish to gain access to the network.

port The physical access point within a communication controller.

ported Software developed for a particular computer which has been rewritten for a different computer is said to have been *ported* to the new computer.

Post Event Auditing The process whereby goods are pre cleared and immediately delivered to the buyer (or the importer), even when subject to technical controls or other reasons for physical inspections. Physical inspection may then take place on the importer's/buyer's premises together with a document audit. This may take place after every transaction or selectively, depending on the level of risk management deployed.

post office The original name in many countries for the PTT (posts, telegraph, and telephone) authority. UK, Germany, Australia, and New Zealand, among many others, had a post office as the initial supervising authority, before breaking it up into separate authorities for posts and telecommunication. Even today, with current technology, the definitions can become blurred.

POTS Plain old telephone service. Voice services.

Pre Authorisation/ Pre Approval See pre clearance. Applied to formalities and technical controls rather than the goods themselves.

Pre Clearance The approval of formalities and channel selection before the goods are presented to Customs for inspection. Pre clearance is also applied to some international passenger travel, especially by sea. Customs formalities can be completed on board, before arrival. Air passenger pre clearance is now commonplace on Pacific routes. It deploys an EDI message called PAXLST (Electronic Passenger Manifest) so that incoming Customs and Immigration authorities may scrutinise passenger details before they arrive, and therefore clear them immediately on arrival.
private domain In X.400, applied to those networks which provide in-house word processing and in-house electronic mail. See **domain; public domain**.

Pre Event Auditing See post event auditing. Goods are inspected and/or paperwork audited before they leave an exporter's premises, in time for scheduled export.

Pre Shipment Inspection (PSI) The process of inspecting or evaluating goods at source, before they are exported from the country of origin. The PSI organisation validates specifications, function, provenance, invoice and price details, quality and quantity (depending on their contract), prior to export. It then allocates a certificate of conformance (COC) to the goods, for the benefit of the importing technical control organisation.

Expense and reliability perceptions make this an unpopular course of action for many categories of goods.

private formats Where a **honeypot** or major company intends to implement EC/EDI only with its own suppliers and customers, it may decide not to implement an industry document standard. In this case it develops something unique for the company or just utilizes an electronic envelope for transactions. See **electronic envelope**.

private key A unique key, assigned to only one entity in a data encryption system.

private line A nonswitched circuit, leased from the PTT.

private network A proprietary network established for a specific in-house purpose; not available to other users.

product numbering association See **ANA, EAN**.

progressive data transfer A technique allowing a sender to transfer data, as it becomes available, to the recipient who creates, for this purpose, a business file. Each transfer is linked by common access reference data.

protocol The set of rules which defines the way in which information can flow within a computer or communication system. A protocol comprises: syntax: commands and responses; semantics: the structured set of requests

and actions permissible by each user; and timing: types of events and sequences.

protocol conversion The process of enabling systems to communicate with systems operating under a different communication protocol. Such protocols include **SNA** and **OSI**.

PSI Pre shipment inspection.

PSTN Public switched telephone network. The backbone, basic telephone network and service, publicly offered by the PTT. See **POTS**.

PTT Posts, telephone, and telegraph. The legal entity set up to operate these services in a given country. Now generally separated into postal and telephone/telecommunication authorities. See **deregulation**.

public domain In X.400, applied to gateways between the networks of public service providers for such things as electronic mail. See **domain; private domain**.

public key A publicly available key which, in connection with a private key, can provide an extra level of addressing and identifying in an encryption system.

Q

QALITY An EC/EDIFACT message. Quality data message.

QR Quick Response (systems). The use of EC/EDI with data bases, bar coding, container and goods coding, and universal product codes in fast-moving retail, apparel, and other industries. See also **ECR**.

qualified data element A data element whose precise meaning is conveyed by an associated **qualifier**.

qualifier An element of data that gives a **qualified data element** or segment a specific meaning. An EC/EDIFACT term.

qualifier code list A list of qualifier values. An EC/EDIFACT term.

queue Any group of items, e.g., jobs or packets, which are waiting for service by a processor. The act of sequencing for the next process.

R

RACE R&D into Advanced Communications for Europe (an EC programme).

ramping The process of adding many new users onto a system.

rapporteur Person who prepares an account of proceedings of a committee for a higher body (OED). Specifically applied to the EC/EDIFACT organization here, but may be generally applied to any UN activity.

RBOC Regional Bell operating company.

read only Applied to a service in which information can only be read from a screen or printer. The information cannot be altered, nor can responding data be sent back down the line to the sending computer.

real time The usually brief time for data to be entered and processed during an interactive session. See **interactive processing**.

receiver (receiving computer) A (temporarily) passive computer in an EC/EDI network. The computer which receives or retrieves EC/EDI documents, directly or via a mailbox.

redundant Applied to data within a message which may be eliminated without affecting the essential information.

regulations The rules drawn up by the PTT under the umbrella of the various telecommunication acts. See **legislation, deregulation**.

reject To refuse a document if, when checked for validation/authentication and standards compliance, it fails to meet the test. The document is rejected and the originator informed. Rejected documents and transactions are recorded in a log.

release character A character used to restore to its original meaning any character used as syntactical separator.

remote job entry The submission of jobs by using a device connected to the processing computer by a data link or network. IBM 2780, 3780 are remote job entry devices. Known as **RJE**.

remote support Technical and systems assistance provided over a telephone or a terminal. This is now typically the first level of support in an EC/EDI system. See **help desk**.

repeating segment A segment which may repeat in a message as indicated in the relevant message specification.

replenishment cycle Apropos JIT inventory control, time between ordering stock and receiving it, with allowance for usage during the time taken for order entry, manufacturing, and delivery.

reroute The action of sending data to a different node (or network of nodes) in a circuit if the original route is obstructed or unusable.

reseller A sales and support organization that buys a service wholesale from a major service provider (e.g., a telco, PTT, or carrier) and provides support to end users in return for a markup on PTT wholesale prices to end users of the service.

resource usage A billing method based upon actual usage of computer, network, storage, etc.

retransmit To continue to attempt transmission when, because of line failures, data corruption, atmospheric conditions, etc., it is not possible to send data over a network on the first attempt.

RFI Request for information, a formal tendering process. The next step after a requirements specification.

RFP Request for proposal. Usually follows an **RFI**. Interchangeable with **RFT**.

RFT Request for tender. The next step after an **RFI**.

RFW Request for work. A document form or procedure used in some industries as the internal trigger to create a new design or custom design for a product.

RHC Regional holding company. Created by the deregulation and splitting up of AT&T into the Bell RHCs. See **telco, PTT**. Also known as RBOC, regional Bell operating company.

RJE **Remote job entry**.

Risk Management The use of computer records and selectivity to decide the level of risk of a certain event happening. For example, a trader might export certain categories of goods every month, and may have done so for years. Even though the goods are subject to technical controls that particular trader might never have been found to have flouted the regulations. In short, he is a good corporate citizen. In this case the computer may only select red channel for post/pre event auditing on one occasion in ten, for example, depending on the algorithms or computer logic used by the Customs system.

The same rationale may be used for traders, for goods categories or HS numbers, for destination country (or supplying country), for suppliers, for times of the year, for carrier, and so on. As experience is built up and as results are compared to computer selections, as the selectivity criteria are refined, then risk management becomes a very effective tool for control. See Appendix for paper on risk management.

RSA The abbreviation for Rivost, Shamir, Aldeman, the developers of an asymmetrical public key encryption system.

S

SAD Single administrative document. The official export, transit and import customs form for international trade. Introduced in the EEC on 1 January, 1988. Also used between EC and EFTA.

SAGITTA A national Dutch customs clearance system.

SCP Simplified clearance procedure (for UK exports).

SDLC Synchronous data link control. An industry standard data communication technique. SDLC is a subset of HDLC, originally developed by IBM. See **HDLC; IBM 3270, 2780/3780**.

SEAGHA System for Electronic and Adopted Interchange in the Port of Antwerp, Belgium.

section control segment A service segment used within the EC/EDIFACT standards to separate header, detail, and summary sections of a message where necessary to avoid ambiguities in the message segment content.

security A generic term generally describing the methods adopted to protect data from loss, corruption, and unauthorized access and retrieval. Methods used include **passwords**, **ID** numbers, authorization, **verification** of message/document type/mailbox address, **validation** of document type and contents, verification of line **ID**, **callback** to sender, and message **time-out**. Encryption is to be used in some trading networks.

security fence The term given to security procedures in mailbox, EC/EDI, and other network-based systems.

segment A predefined and identified set of normally functionally related data elements which are identified by their sequential positions within the set. A segment starts with a segment tag and ends with a segment terminator. It can be a service or a user data segment. An EC/EDIFACT term.

segment code A code which uniquely identifies each segment as specified in a segment directory. An EC/EDIFACT term.

segment directory A listing of identified, named, described and specified segments.

segment name One or more words identifying a data segment concept. An EC/EDIFACT term.

segment qualifier See **qualifier**.

segment specifications The contents, structure, and attribute of a segment. An EC/EDIFACT term.

segment tag A composite data element, in which the first component data element contains a code which uniquely identifies a segment as specified in the relevant segment directory. Additional component data elements can be conditionally used to indicate the hierarchical level and nesting relation in a message and the incidence of repetition of a segment.

segment terminator The syntax character which is used to identify the end of a segment. An EC/EDIFACT term.

Self Certification The process of setting and testing performance and quality standards. Self certification is undertaken internally within an organisation but to internationally recognised standards. Self regulating organisations are regularly audited by external authorities.

Self Certification The process of setting and testing performance and quality standards. Self certification is undertaken internally within an organisation but to internationally recognised standards. Self regulating organisations are regularly audited by external authorities.

send To transmit data.

separator character A character used for syntactical separation of data.

server The computer at the heart of an EC/EDI system. See **EC/EDI server; mailbox**.

service data element A data element used in service segments.

service segment A segment required to service the interchange of user data. An EC/EDIFACT term.

service string advice A character string at the beginning of an interchange defining the syntactically delimiting characters and indicators used in the interchange.

service vendor See **vendor**.

session See **communication session**.

SHIPNET A network for EC/EDI in international trade, specific to the freight carriage and forwarding industry.

sign on See **log on**.

simple data element A data element whose data item representation embodies a single concept, i.e., a data element which is not made up of component data elements.

simple segment A segment which requires no qualification, i.e., whose meaning is fixed and explicit.

SiSTEMI TeLEMATICA A VAN for the port of Genoa, Italy.

SITA Système Internationale Transport Aèrienne (or Aèronautique), an organization that provides all of the communication and message switching services between international airlines. SITA is actually a **VAN**, since most of the application tasks are performed by the computers belonging to the airlines themselves—SITA's membership. SITA is represented on EC/EDIFACT committees.

SITPRO An acronym for Simpler International Trade Procedures. Originally set up as a department within the British Department of Trade and Industry, but now operates commercially. SITPRO's task was to design a universal set of documents for use by British industry involved in import/export. It now offers software for document translation and is represented on EC/EDIFACT committees.

SMMT The (UK) Society of Motor Manufacturers and Traders, the organization which represents British auto manufacturers. SMMT commissioned the first auto-specific EC/EDI scheme, in close coordination with ODETTE.

SNA Systems Network Architecture. An IBM proprietary communication protocol. Although a de facto standard, employed by 30,000 IBM hosts around the world, for many years SNA did not yet conform to ISO standards as does OSI. Indeed it had some trouble connecting to X.25 networks, since SNA was developed on the basis that it would be talking only to IBM hosts, with leased lines between them. Since X.25 employs dial-up as well as leased lines, for the switching of data packets it needs to poll nodes. Sophisticated additional software is required by an IBM communication controller to use an X.25 packet switched network, enabling SNA to operate within a polling environment. See **NPSI, polling, X.25**.

SOFI (1 and 2) A French equivalent of the UK Customs CHIEF system.

software-defined network See **network**.

special interest group See **common interest group; common user group**.

SPIC Simplified Procedure for Import Clearance (part of DEPS).

standard level The specific release level of a standard, effective at a given date. A new release occurs once or twice a year.

standards The rules which are laid down to enable incompatible computers and communication systems to exchange information and to enable document types to be exchanged. See **ANSI, CCITT, document standards**.

store and forward The term commonly applied to a messaging (e.g., electronic mail) system where a message is stored before delivery to a third party. The term implies that the mailbox system itself performs delivery to the addressee, i.e., direct delivery. This is the key difference between *store and forward* and *store and retrieve*. In point of fact most mailbox systems allow retrieval and perform direct delivery. Provided there is a time delay induced by the mailbox system, they are both acceptable services under most telecommunication regimes.

store and retrieve Applied to a system in which a message is sent to a mailbox and resides there until retrieved by the addressee, or possibly by being purged to an archive file if the message lies dormant for, say, 4 weeks. Purging routines vary with the system being used.

suite (of programs) A series of computer programs which interact with each other.

summary area The portion of the message which follows the body of the message and which contains summary information relating to the entire message.

supply cycle The lead time between placing one order and the next. See **JIT, QR and ECR**.

support The assistance necessary to install, test, and fully implement a system. Support includes consultancy advice, software provision and installation, education, training, fault diagnosis and correction, help desk, and so on. Not everyone needs "cradle to grave" support, but, in the early stages of EC/EDI, more rather than less support is likely to be necessary.

SWIFT Society for Worldwide Interbank Financial Telecommunications. SWIFT is a VAN originally set up by banks for the purpose of international EFT. SWIFT now has something of the order of 3000 members waiting to use its SWIFT II upgraded network and systems. SWIFT progressed from being a telex-type EFT interchange system to a full-fledged multidocument (financial) EC/EDI system. It has codified over 150 message types.

switched network See **network**.

sync (synchronous) A clock-controlled method of data transmission for use in high-speed circuits or networks. See **bisync, async**.

syntax rules Rules governing the structure of an interchange and its functional groups, messages, segments, and data elements.

system administration The function of allocating mailbox addresses, user ID, passwords; checking security routines; bulk printing; conducting audit routines; housekeeping; gathering statistics; billing; etc.

system interconnect See **network; integration**.

systems integration See **network**.

systems management The tasks involved in keeping a network in service and providing access to valid users. It also involves security, logging, and providing statistics, billing, and central services such as printing. It embraces **systems administration** within its function.

systems study A review of existing internal methods of operation (e.g., how purchase orders are raised and authorized) to set the scene for anticipated changes induced by paperless methods of performing the same task. Changes will include clerical tasks, job functions, computer systems, possibly even office locations.

T

table-driven program A program in which the factors, variables, data, etc. to be used are looked up from a table or matrix, held on a file or in memory.

tag A unique identifier for a segment or data element. An EC/EDIFACT term.

target computer The computer for which a specific message or file is intended. In EC/EDI systems this could be sent direct from computer to computer or via the intermEC/EDIary of a mailbox system. Data volumes determine the method used. See **host to host**.

TARIC The EC's Integrated Customs Tariff, based on HS. See **EC, HS**.

TC 154 Technical Committee 154, a UN committee affiliated with **UNECE WP.4** for the purpose of agreeing on EC/EDIFACT document standards through ISO.

TDCC Transportation Data Coordinating Committee. An early (1960s) standards-setting committee, established to assist American transportation modes coordinate EC/EDI standards for air, motor, rail, and ocean transportation.

TDED UNECE Trade Data Elements Directory.

TDI Trade Data Interchange, directory developed by UNECE. See **GTDI**.

TDL A Scandinavian trade facilitation organization.

TEC/EDIS An EC and EFTA programme to promote the use of EC/EDI. Trade Electronic Data Interchange System.

telco An American acronym for telephone company (i.e., a **carrier** or **PTT**). Basically the national, regulated carrier or (now) in the case of the US, since the breakup at AT&T, an **RHC** (or "Baby Bell"). See **deregulation**.

Telecom Gold British Telecom electronic mail and X.400 messaging systems.

telecommunication (Also **comms** or **telecoms**). The use of a network for the transmission of voice, data, or image. All that is implied by the switching process. The generic name for remote communication using modern technologies. To paraphrase the *Penguin Dictionary of Telecommunications*: "Communication between two people using equipment to overcome the effects caused by distance or physical barriers between them."

telegraph; telegraphy Terms used to denote earlier forms of alphabetic (nonvoice) messaging over a communication network, such as wire telegraphs, telegrams, telex. Uses a limited character set. See **baud, baudot**.

telematics The technological area of overlap between data processing and data communications.

telemetry The science of transmitting electrical measurements over networks to remote systems for recording and analysis.

telephony The engineering science of converting voice into electrical signals and reconverting them to voice.

teleprinter A printer used (now) generally remotely as a telegraph, telex, or limited-character-set printer. Early computers used them as consoles and system printers.

teletex An attempt to provide a "black box" approach to solving the problems of incompatible devices, e.g., word processors. New network and software technology, together with standards development, has caused a very low acceptance rate of teletex services.

telex Probably, after the telegram, the longest-lived network data service. There are still around 2 million telex machines in use today but they are gradually being replaced by fax and advanced network services, such as **EC/EDI** and **MHS**. See **telegraph**.

telex refiler A service for telex users in which someone in, say, Australia wishing to send a telex to an overseas destination first sends it to a host

system (the refilers) in, say, Sydney. The refiler will then batch together all telexes to go to a particular country, say the US, and then send them to its computer in the US, where they are distributed over the local telex network. It has the effect of reducing telex costs to the end user, but there can be disadvantages, especially in the area of **call back**, hence in legal validity.

terminal A point where data can either enter or leave the network. See **DCE, DTE.**

time charging A method of charging for the use of network which calculates charges on the basis of network connect time rather than a flat fee.

time delay system A network-based system where, as a consequence of adding value to a message, a time delay is added. For example, EC/EDI or a mailbox electronic mail system.

time-out Occurs when the time limit established for a certain action, e.g., receipt of a message, has been exceeded. The message is rejected and the end user is so informed. Some systems allow only a certain time between accessing a mailbox and sending a message. If the mailbox is open for, say, 5 minutes, and a message has still not been sent, the computer will disconnect the mailbox with an appropriate message to the terminal operator. This is for both security and economic reasons.

time-sharing The original term given in the late 1950s – early 1960s to the technique which enables multiple users to simultaneously access a large computer without being aware (or concerned) that other people were using it at the same time. As the cost of computing declined, especially after the PC was introduced, time-sharing services gradually fell from favor, but with mailbox services, MHS, EC/EDI, and the like, time-sharing principles—especially their operating systems—have made a comeback.

time slot The time set by communicating computers during which they will exchange data.

TPA see **trading partner agreement.**
Tradacoms Message standards for data interchange between major UK retailers and their suppliers. Developed by the **ANA**, it uses UN/EDIFACT (now EANCOM) syntax standards.

trade clusters A grouping of interested trading partners, generally for international trade. See **trade facilitation.**

trade facilitation The generic description applied to EC/EDI systems involved in import/export. See **additive trading relationships.**

Tradegate An Australian trade facilitation organization comprising QANTAS, shipping and container companies, Australian Customs, and a variety of traders and industry bodies.

Tradelink A projected Hong Kong EC/EDI trade facilitation organization.

Tradenet A Singapore EC/EDI trade facilitation service.

trading bodies See **industry bodies**.

trading partner agreement (TPA) A generic term for a contract describing new electronic terms and conditions of trading. A national or industry based contract which substitutes an individual company's terms and conditions of trade with electronic commerce protocols. TPAs are agreements to replace paper with electronics, to agree the details of exchange and receipt, and to preserve their right to utilise common law in cases of dispute.

See legal issues in this report and in web site references.

trading relationships See **partner-to-partner relationship**.

trailer Data at the end of an EC/EDI message indicating the conclusion of the message.

transaction A single completed transmission, for example, the transmission of a single invoice over an EC/EDI network. This is no different from data processing usage, where a transaction could be an enquiry or a whole range of updates and trading transactions. The definition is important for interpretation of invoices from EC/EDI service operators.

transaction pricing A charging and billing system based upon the numbers of transactions of different types processed by the EC/EDI system, over a given period of time. See **resource usage**.

transaction set In EC/EDI standards, the name given to a complete trading document sent electronically, e.g., an invoice. Also known as a message.

transaction set identifier Synonym for **message code**.

transaction set trailer Synonym for **message trailer**.

transcription errors Mistakes and omissions caused by copying information from one document to another, whether done clerically or via a keyboard.

transfer A communication from one partner to another.

translation See **document translation**.

transmission rates See **baud, bps**.

Transparency A system whereby all activity is open to scrutiny; where there is no opportunity for hidden transactions or corrupt practises.

transparent A commonly used computer term which refers to technically difficult environments which are not apparent to the end user, who for example may be sending a message from an IBM system (say) to a mail box system for subsequent retrieval by a Unisys computer (say). The user should not be aware of the work involved in making this possible. The difficulties should be *transparent* to the end user.

transport A generalized term for the function of a network, i.e., the network transports data.

transpotel An international freight market information system operating in UK and Europe.

U

UA User agent. A term in X.400 to describe the protocol for user access to MHS.

UCS Uniform Communications Standard. An X12 subcommittee on document standards for the grocery industry in the US.

UIC International Union of Railways.

UIRR Union of International Rail and Road Transport.

UN United Nations.

unattended mode Operating without manual (operator) intervention.

UNCID The ICC'S Uniform Rules of Conduct for Interchange of Trade Data by Teletransmission.
UNCITRAL United Nations Commission on International Trade Law.

UNCTAD United Nations Conference on Trade and Development.

UNECE United Nations Economic Commission for Europe.

UNECE WP.4 United Nations Economic Commission for Europe, Working Party No. 4. Part of the EC/EDIFACT organization.

UN/GTDI UN Guidelines for Trade Data Interchange. See **GTDI**. A forerunner of UN/EDIFACT.

UNICORN An EC/EDI project for ferry sailings in Europe.

UNIDO United Nations Industrial Development Organization.

uninterruptible power supply (UPS) Special backed-up power supplies for computer systems which provide a public or strategically important service. Whatever happens to the electricity supply, the UPS ensures that current keeps flowing to the computer.

universal product code The bar-coded description of a retail item. The UPC system has now been applied to industrial goods as well and is also being extended to include specific size and style data. It can only be applied to items with standard units of measure. For example, ingots and sheets of steel are still difficult to codify. See **ANA, EAN**.

UN-JEC/EDI United Nations Joint Electronic Data Interchange committee working on converging European and North American EC/EDI standards. The committee proposed and is developing the EC/EDIFACT standards.

UNSM United Nations Standard Message. An international message which has been approved by the UNECE.

UNTDED UN Trade Data Element Directory (developed by the UNECE). Identical to ISO 7372.

UPC universal product code.

UPS uninterruptable power supply.

user data segment A segment containing application data. An EC/EDIFACT term.

user ID A password and identification number which enables an end user to sign on to a system. See **log on**.

V

VADS **Value-added data service.**

validation The process of checking whether a document is the correct type for a particular EC/EDI system and whether it comes from and is going to an authorized user. All of the EC/EDIting and syntax checking involved in standards conformance. See **compliance checking**.

value-added data service (VADS) A network-based data service which adds significant value to the basic function of carriage or message switching, provided by a PTT. An EC/EDI service is considered to be a VADS.

value-added network services (VAN[S]) The computers and networks which enable any agency or trading partner to establish an indirect connection (via a mailbox) between their computer systems and those of their trading partners in order to exchange formatted messages used in the trade process. A VAN is compatible with all current technologies. It facilitates the secure exchange of messages between trading partners. It maintains billing systems, audit trails, backup, archives and performs checks on incoming messages to ensure that they are to/from registered trading partners, that they conform to approved standards, for specific transaction and message sets, for specific trading partners.

value-added service (VAS) An early name for VADS; VAS can apply to voice, data, and image services. Broadly speaking, only data VAS (VADS) is approved in most countries at the moment.

value exchange In context with **goods movement** and **information exchange**, this term refers to the payment cycle and new payment methods.

VAN Value-added network.

VAS Value-added service.

vapourware A nonexistent software product; "blue sky". See **futures**.

vendor The commonly accepted computer/electronics jargon for *sales organization*. Hence IBM is a computer vendor, a PTT is a service vendor.

verification See **compliance checking, validation**.

version number Number used to identify the particular release or version of a standard. Can also widely be applied to software, to standards, and to documentation.

VICS Voluntary interindustry communication standards, document standards in use by supermarkets, retail industries, etc. Particularly espoused by the QRS advocates.

videotex A screen-based, full-color, basically read-only network service. Useful because it uses cheap and readily available equipment, e.g., converted TV sets. Used for on-line financial information, such as currency exchange rates. Most widely used in travel agency/tourism applications. Drawbacks include lack of security and slow transmission rates (1200/75 baud). Another VADS, provided by the PTT in many countries. Standards coordinated by CEPT. *Note:* Videotex is known, confusingly, as teletext in New Zealand. Teletex has an entirely different meaning elsewhere. See **teletex**.

V.Series A series of recommendations by CCITT governing data transmission over telephone circuits.

W

WAN Wide area network; a network connecting terminals and computers within a few thousand feet. See **mainframe/mini/micro**.

WATS Wide area telephone service, a telco service. Includes in-WATS (or 800 service) and out-WATS, calls from a central location.

WCO World Customs Organisation. Formerly known as CCC (Customs Cooperation Council).

WINS An X12 subset. Warehouse Information Network Standards. Applies to grocery warehouses and refrigeration warehouse document standards. See **ANSI; UCS**.

wire services News services, originally based on telex but now screen-based. Service providers include Reuters, AP, UPI, etc.

workstation A personal computer or a terminal, that enables an end user to communicate with the network and the service provider.

WP.4 See **UNECE WP.4**.

X

X.Series A confusing label. X applies to either a committee setting a standard or the standard itself. For example, ANSI has, among many, the following committees: X3 for FORTRAN upgrades, X9.9 for data encryption standards, and X12 for EC/EDI. CCITT has X.25 for communication recommendations and has X.400 for messaging recommendations. The X followed by a dot refers to CCITT recommendations. The absence of a dot implies an ANSI ASC committee prefix. See **ANSI; CCITT; ISO**. *Note:* ISO has its own series of alternate numbers for CCITT recommendations.

X modem A protocol used in conjunction with a PC to protect the transmission of data across a dialled-up line. Also called X.PC by some network operators.

The message header (service segment UNH) is the first segment in a message, and the Message trailer (service segment UNT) is the last.

To document the message structure either segment tables or branching diagrams are used. Their main purpose is to secure the correct sequencing of segments.

When specifying new or changed messages, great care should be taken to avoid segment collision. This occurs when a segment is used for different purposes in different positions in the message without separating the positions by means of mandatory elements.

One mechanism often used is to place "stand-alone" segments before segment groups, another is to make use of the service segment Section control (service segment UNT) to divide the message into sections.

2.90 Functional Groups

These refer to identical groups of messages, for example all purchase orders to one company.

2.91 Interchange

An interchange contains all communication between trading partners. It is the envelope which contains the messages and their associated functional groups. The interchange envelope contains information concerning the complete interchange. It contains a logical nested structure of functional groups and messages.

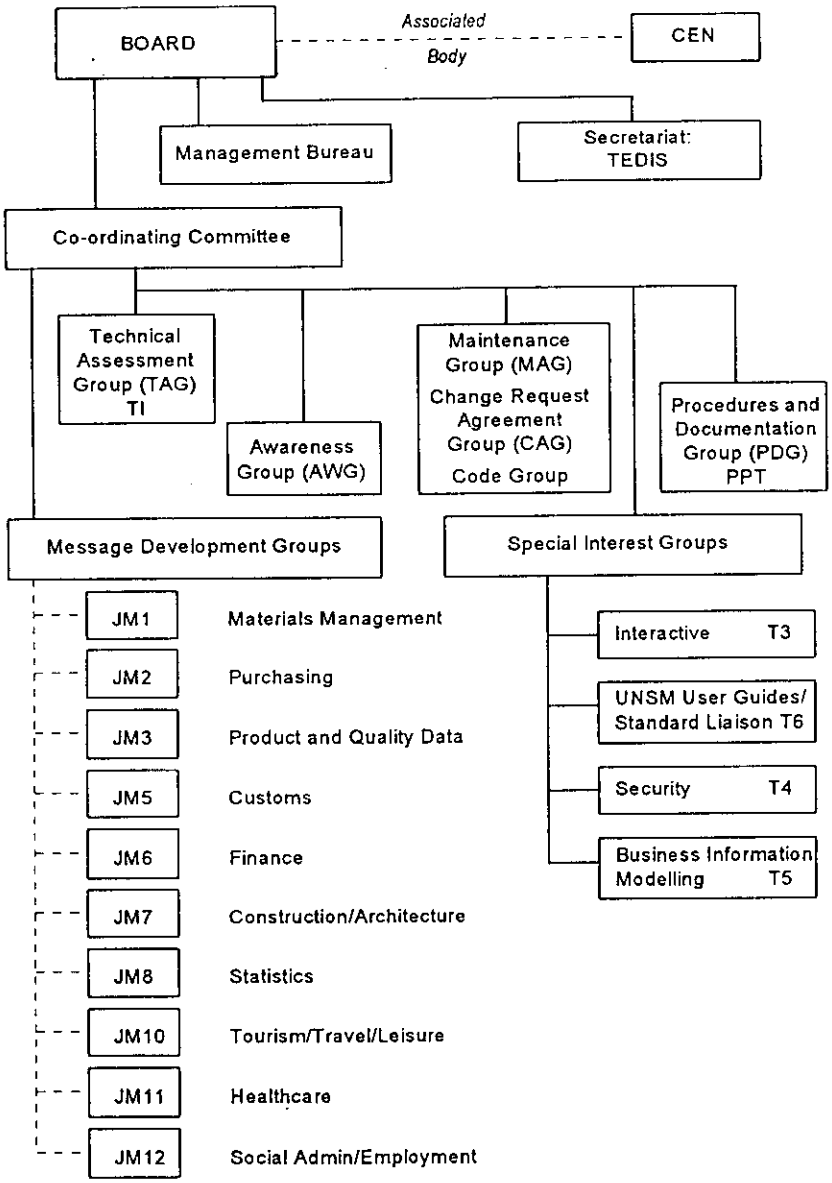
2.92 Message Design Guidelines

Message design guidelines are the EDIFACT rules which allow groups designing new messages or modifying existing messages to do so in a consistent and predictable manner.

These guidelines are the set of rules for software developers and implementers.

the process little consideration needs to be given to the technical aspects of the message.

they are approved they are distributed to other regions. If rejected the relevant industry group is notified. Change Requests coming in from other regions also pass through the local TAG. Every attempt will be made to ensure that interested Industry Groups are provided with copies of the changes for review and action if necessary.



Western European EDIFACT Board Structure

Diagram 5: A Typical Regional EDIFACT Organisation Description

3.70 Other Deliverables

At present there are no other directories, but there are

- Working documents (R.xxx documents)
- Reports, Committee Drafts and Working Drafts
- Agenda

3.80 Central Repository (EDICORE)

The UNTDID and all other deliverables are available via the secretariat of the UN/ECE as paper printout; the directories of messages and their supporting directories are distributed on diskette only.

In the near future all documentation shall be available electronically via E-mail connection.

Appendix (I) Work Group and Chairs (April 1995)

G2	Promotion Advisory Team	Hans Hansell UN/ECE
G4	Legal Rapporteurs	Jeffrey Ritter Rapporteur
G5	Secretariats	Hans Hansell UN/ECE
T1	JTAG (Joint Technical Advisory Group)	Harry Featherstone PAEB Marcel Deturche WEEB
T3	Interactive EDI	John Berge WEEB Randolph Robinette PAEB
T4	Security	Terry Dosdale WEEB
T5	Business & Information Modelling	David Files PAEB Colin Clark WEEB
T6	Standards Liaison Group	Klaus-Dieter Naujok Rapporteur
JM1	Materials Management	Hartmut Hermes WEEB Jim Sykes PAEB
JM2	Purchasing	Margaret Pemberton ANZEB Mounir El-Khoury WEEB
JM3	Product & Quality Data	Philippe de Ramiro WEEB Dana Ulery PAEB
JM4	Transport	Barry Keogh ANZEB Ben Milbrandt PAEB Dominique Vankemmel WEEB
JM5	Customs	Gareth Lewis ANZEB Dietmar Jost WEEB Susan Larose PAEB
JM6	Finance	Renato Polo WEEB
JM7	Construction/Architecture	Peter Vice WEEB
JM8	Statistics	Philippe Lebaube WEEB Brian Pink ANZEB

JM10	Tourism, Travel & Leisure	Mike Cogan WEEB Larry Peterson PAEB
JM11	Healthcare	Jim Chapman ANZEB Brian Love WEEB
JM12	Social Administration & Employment	John Sumner WEEB Yao-Chin Lin ASEB
TTA	Technical Advisors	Klaus-Dieter Naujok David Dobbing Don Trafford
DPT	Directory Production Team	Jean Kubler UN/ECE

Appendix (ii) UN/EDIFACT Approved Messages

Effective June 1st 1995 , a package of changes in message status was approved at the Sydney (Australia) JRT Meeting.

UN/EDIFACT message status levels are:

Status	Level of Status	Description
0	Draft Document	Work is progressing but has not reached an advanced stage. Document issued for information only.
1	Draft Recommendation	Document has been approved by WP.4 for trial use (equivalent to Draft Standard)
2	Recommendation	Document has been approved and registered by WP.4 as a formal recommendation (equivalent to Standard)

A current list of the UN/EDIFACT messages (designated by message status) follows (Release D95.A 95-01-06)

Message Type	Message	Status	Revision
APERAK	Application error and acknowledgement	1	1
AUTHOR	Authorisation	1	2
BANSTA	Banking status	1	2
BAPLIE	Bayplan/stowage plan occupied and empty locations	2	2
BAPLTE	Bayplan/stowage plan total numbers	2	2
BOPBNK	Bank transactions and portfolio transactions report	1	1

Message Type	Message	Status	Revision
BOPCUS	Balance of payment customer transaction report	1	1
BOPDIR	Direct balance of payment declaration	1	1
BOPINF	Balance of payment information from customer	1	1
CALINF	Call info	1	1
COARRI	Container discharge/loading report	1	1
CODECO	Container gate-in/gate-out report	1	1
CODENO	Permit expiration/clearance ready notice	1	1
COEDOR	Container stock report	1	1
COHAOR	Container special handling order	1	1
COMDIS	Commercial dispute	1	1
CONAPW	Advice on pending works	1	1
CONDPV	Direct payment valuation	2	2
CONDRA	Drawing administration	1	1
CONDRO	Drawing organisation	1	1
CONEST	Establishment of contract	2	2
CONITT	Invitation to tender	2	2
CONPVA	Payment valuation	2	2
CONQVA	Quantity valuation	2	1
CONRPW	Response of pending works	1	1
CONTEN	Tender	2	2

Message Type	Message	Status	Revision
CONWQD	Work item quantity determination	1	1
COPARN	Container announcement	1	1
COPINO	Container pre-notification	1	1
COPRAR	Container discharge/loading order	1	1
COREOR	Container release order	1	1
COSTCO	Container stuffing/stripping confirmation	1	
COSTOR	Container stuffing/stripping order	1	1
CREADV	Credit advice	2	2
CREEXT	Extended credit advice	2	2
CREMUL	Multiple credit advice	1	1
CUSCAR	Customs cargo report	2	2
CUSDEC	Customs declaration	2	2
CUSEXP	Customs express consignment declaration	1	2
CUSREP	Customs conveyance report	2	1
CUSRES	Customs response	2	2
DEBADV	Debit advice	2	2
DEBMUL	Multiple debit advice	1	1
DELFOR	Delivery schedule	2	2
DELJIT	Delivery just in time	2	2
DESADV	Despatch advice	2	3
DIRDEB	Direct debit	1	2

Message Type	Message	Status	Revision
DOCADV	Documentary credit advice	1	2
DOCAMA	Advice of an amendment of a documentary credit	1	1
DOCAMI	Documentary credit amendment information	1	1
DOCAMR	Request for an amendment of a documentary credit	1	1
DOCAPP	Documentary credit application	1	2
DOCARE	Response to an amendment of a documentary credit	1	1
DOCINF	Documentary credit issuance information	1	2
FINCAN	Financial cancellation	1	1
FINSTA	Financial statement of an account	1	1
GESMES	Generic statistical	1	1
HANMOV	Cargo/goods handling and movement	1	1
IFCSUM	Forwarding and consolidation summary	2	3
IFTCCA	Forwarding and transport shipment charge calculation	1	1
IFTDGN	Dangerous goods notification	1	1
IFTIAG	Dangerous cargo list	1	1
IFTMAN	Arrival notice	2	3
IFTMBC	Booking confirmation	2	2
IFTMBF	Firm booking	2	3
IFTMBP	Provisional booking	2	2

Message Type	Message	Status	Revision
IFTMCS	Instruction contract status	2	3
IFTMIN	Instruction	2	3
IFTRIN	Forwarding and transport rate information	1	1
IFTSAI	Forwarding and transport schedule and availability information	1	1
IFTSTA	International multimodal status report	1	3
IFTSTQ	International multimodal status request	1	1
INSPRE	Insurance premium	1	1
INVOIC	Invoice	2	3
INVRPT	Inventory report	2	2
MOVINS	Stowage instruction	1	1
ORDCHG	Purchase order change request	2	3
ORDERS	Purchase order	2	3
ORDRSP	Purchase order response	2	3
PARTIN	Party information	2	2
PAXLST	Passenger list	2	1
PAYDUC	Payroll deductions advice	2	1
PAYEXT	Extended payment order	2	2
PAYMUL	Multiple payment order	1	2
PAYORD	Payment order	2	2
PRICAT	Price/sales catalogue	1	2

Message Type	Message	Status	Revision
PRODEX	Product exchange reconciliation	1	1
PRPAID	Insurance premium payment	1	1
QALITY	Quality data	2	3
QUOTES	Quote	2	3
RECECO	Credit risk cover	1	1
REMADV	Remittance advice	2	3
REQDOC	Request for document	1	2
REQOTE	Request for quote	2	3
SANCRT	Sanitary/phytosanitary certificate	1	1
SLSFCT	Sales forecast	1	1
SLSRPT	Sales data report	1	1
STATAC	Statement of account	2	1
SUPCOT	Superannuation contributions advice	2	1
SUPMAN	Superannuation maintenance	2	1
VESDEP	Vessel departure	1	1

Appendix (iii): EDIFACT Message Table (From Purchase Order Message, ORDERS)

TAG	NAME	S	REPT	S	REPT
UNH	Message Header	M	1		
BGM	Beginning of message	M	1		
RFF	References	C	10		
CTA	Contact Segment	C	10		
	Segment Group 1			C	20
NAD	Name and address	M	1		
LOC	Location identification	C	5		
RFF	References	C	10		
DOC	Documents Required	C	5		
CTA	Contact Segment	C	5		
FII	Financial institution information	C	5		
DTM	Date/Time Reference	C	5		
	Segment Group 2			C	5
TRI	Tax Related Information	M	1		
LOC	Location identification	C	5		
	Segment Group 3			C	5
CUX	Currencies	M	1		
DTM	Date/Time Reference	C	5		
ALI	Additional Information	C	5		
FTX	Free Text	C	5		
PAT	Payment Terms Basis	C	10		
PAI	Payment Instructions	C	1		
	Segment Group 4			C	10
TDT	Details of transport	M	1		
	Segment Group 5			C	10
LOC	Location identification	M	1		
DTM	Date/Time Reference	C	1		
TOD	Terms of delivery	C	5		
	Segment Group 6			C	10
PAC	Package	M	1		
MEA	Measurements	C	5		
PCI	Package identification	C	5		
	Segment Group 7			C	10
EQF	Equipment Fixed Information	M	1		
EQA	Equipment attached	C	5		
HAN	Handling instruction	C	5		
FTX	Free Text	C	5		

S = Status REPT = Repetitions C = Conditional M = Mandatory

Appendix (iv): Character Sets

For the characters in the sets below, the 7-bit codes in the basic ISO 646 standard shall be used, unless the corresponding 8-bit codes in ISO 6937 and 8859 or other bit codes are specifically agreed between the interchanging partners.

Letters, upper case	A to Z	
Numerals	0 to 9	
Space character		
Full stop	.	
Comma	,	
Hyphen/minus sign	-	
Opening parentheses	(	
Closing parentheses	)	
Oblique stroke (slash)	/	
Equals sign	=	
		Reserved for use as:
Apostrophe	'	segment terminator
Plus sign	+	segment tag and data element separator
Colon	:	component data element separator
Question mark	?	release character

The following characters are part of the Level A character set but cannot be used internationally in telex transmissions:

Exclamation mark	!
Quotation mark	"
Percentage sign	%
Ampersand	&
Asterisk	*
Semi-colon	;
Less-than sign	<
Greater-than sign	>

Character Set: Level A

This character set is not intended for transmission to telex machines.

Letters, upper case	A to Z
Letters, lower case	a to z
Numerals	0 to 9
Space character	
Full stop	.
Comma	,
Hyphen/minus sign	-
Opening parentheses	(
Closing parentheses	)
Oblique stroke (slash)	/
Apostrophe	'
Plus sign	+
Colon	:
Equals sign	=
Question mark	?
Exclamation mark	!
Quotation mark	"
Percentage sign	%
Ampersand	&
Asterisk	*
Semi-colon	;
Less-than sign	<
Greater-than sign	>

Information separator IS4	segment terminator
Information separator IS3	data element separator
Information separator IS1	component data element separator

Character Set: Level B

Appendix (v): Separators

Specially reserved characters used for data separation and other 'control' aspects have been reserved as a subset of each character set.
Level A character set recommended usage:

:	the colon – the component data element separation
+	the plus sign – for data element, 'simple' or composite, separation;
.	or, the point or comma – for decimal indication;
?	the query – for release indication;
'	the apostrophe – for segment termination.

Separators: Control Characters

Appendix (vi): Excerpt From UNTDID BOPBNK, Status 1 Message, 1-06-95

UN/EDIFACT

DRAFT RECOMMENDATION

Bank transactions and portfolio transactions report message

This message is available for formal trial for at least six months from the date of approval by UN/ECE/TRADE/WP.4.

Organisations are invited to trial this message. Comments on the results from the trial should be forwarded to their Rapporteur's Team Secretariat as soon as they are available. Based on the results of the trials, a UNSM may be issued.

The segments, composite data elements, data elements and codes for use in the trial of this message are contained in the Draft directory. However, this information may differ from that in the Standard directory (UNTDID), even for material having the same identifying tags.

Message Type : BOPBNK
Version : D
Release : 95A
Contr. Agency: UN
Status : 1
Revision : 1
Date : 95-01-06

For general information on UN standard message types see UN Trade Data Interchange Directory, UNTDID, Part 4, Section 2.6, UN/ECE UNSM General Introduction

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0. INTRODUCTION

This specification provides the definition of the Bank transactions and portfolio transactions report message (BOPBNK) to be used in Electronic Data Interchange (EDI) between trading partners involved in administration, commerce and transport.

1. SCOPE

1.1 Functional Definition

The message could be sent by banks to BOP compiler for reporting of the banks' own transactions, aggregated individual customer transactions and portfolio transactions. The message could also be used for reporting the assets and liabilities positions of the banks.

1.2 Field of Application

The message could be sent by banks to BOP compiler for reporting of the banks' own transactions, aggregated individual customer transactions and portfolio transactions. The message could also be used for reporting the assets and liabilities positions of the banks.

1.3 Principles

The message intends to enable a resident bank to report on:

. their own transactions (including portfolio transactions)
. the aggregated customer transactions
. their own assets and liabilities position

All those reports are handled within the same structure. The difference stands only in the meanings of the segments. A clear

A segment to give the opening balance and the closing balance of the account and the currency.

0140 Segment group 4: RCS-FTX-SG5
A group of segments to give for each currency the relevant information.

0150 RCS, Requirements and conditions
A segment to give the nature of transaction or the type of position. A qualifier allows a clear distinction.

0160 FTX, Free text
A segment to give information in clear and free form to provide explanations about the nature of the transaction or about the position.

0170 Segment group 5: MOA-SG6-SG7-NAD-LOC
A group of segments to give the amount and details of each different nature of the transaction or the amount and details related to the position.

0180 MOA, Monetary amount
A segment to give the amount, and if necessary the currency, of the transaction or of the position.

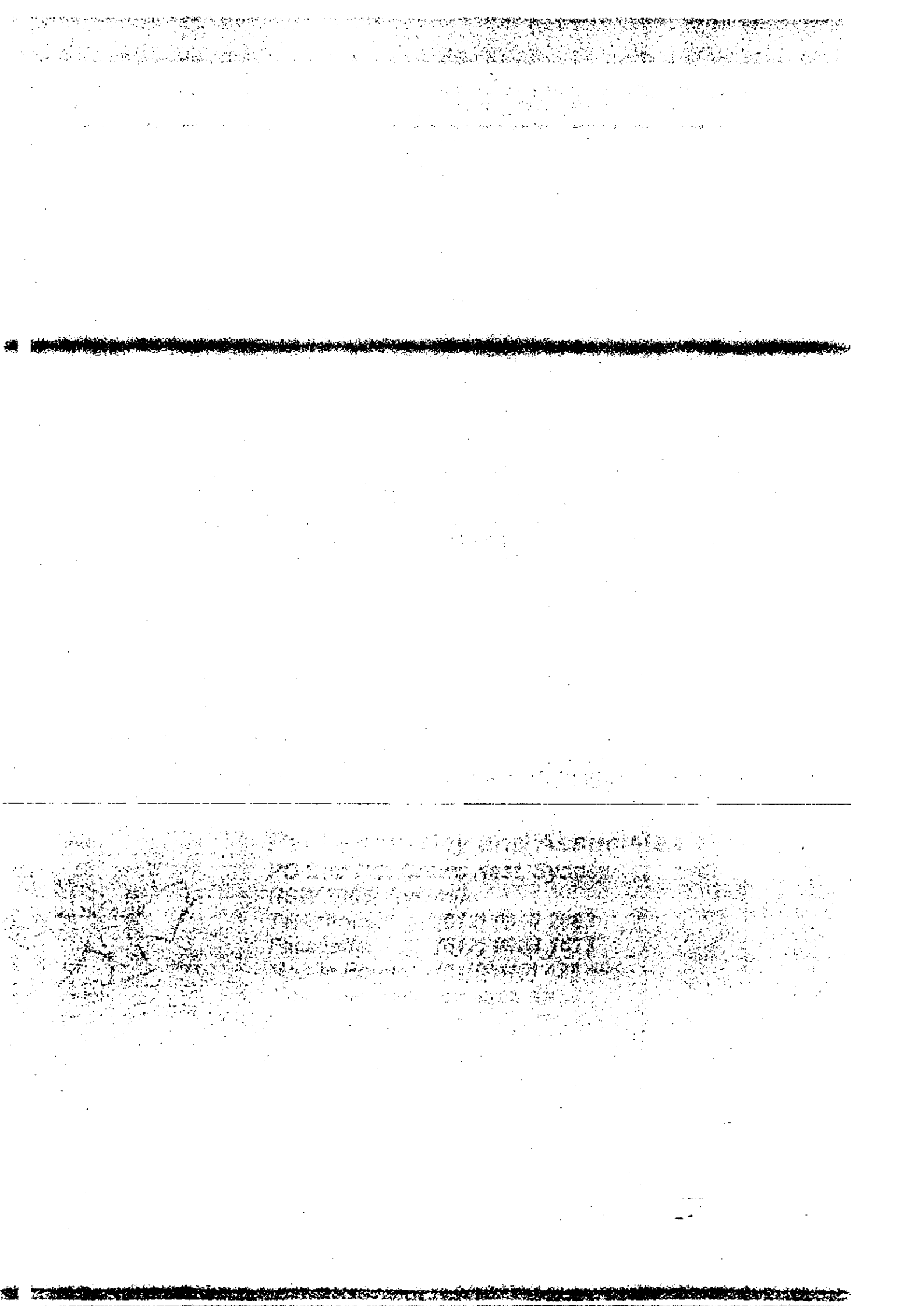
0190 Segment group 6: GIR-QTY-PRI
A group of segments to give the identification and the quantity of security.

0200 GIR, Related identification numbers
A segment to identify the type of security (shares, bonds, etc).

0210 QTY, Quantity
A segment to specify the quantity of security.

0220 PRI, Price details
A segment to give the face value of the security.

0230 Segment group 7: RFF-DTM
A group of segments to give the references and dates of the transaction.



The second point of contact is through a range of familiar devices: the TV, radio, telephone or mail and fax. Generally used for direct response selling, there are many different applications, most of them well known. They include catalogue and mail order selling, in which the retail consumer or client needs to fill in a form and post or fax the completed form. Payment may be made later or a credit card number may be quoted on the form. Telephoning a toll free number in order to dictate information to an operator or voice response service is a widely used variant.

The third category, and principal subject of this section, is where the consumer or client has access to some sort of on-line device. We tend to think in terms of personal computers (from the home) or corporate computers from the work place. But there will soon be a range of network computers and mobile phone devices that will perform similar functions, in addition to public access bureaux or kiosks, not to mention Internet access from cable TV. Hence the client is now able to request goods or services through an increasing number of on line devices, overwhelmingly using the Internet but possibly some private networks too.

The point in identifying these three broad categories of points of contact, sale and service is to emphasise that they are all designed to achieve two things:

- To capture all transaction data at the point of contact (plus as much discretionary or "soft" data, for future marketing purposes), in exactly the same way that an Electronic Point Of Sale (EPOS) does in today's stores and supermarkets;

- To facilitate exchange of value, or payment at the point of contact, in exactly the same manner as an Electronic Funds Transfer at Point of Sale (EFTPOS) device in stores and supermarkets.

Once these objectives have been achieved it is possible to automate downstream processes, just as the retail and automotive industries have done by implementing QR and JIT. For example automotive manufacturers claim savings, at cost, of over US$200 per vehicle from EDI assisted JIT methods. Retailers, especially supermarkets, have seen their investment reduce from over 18 weeks of inventory in the supply chain to a matter of days, and, one day, hours. These efficiencies lead to better prices, better service, better choice and fresher produce for the consumer and more competitive industries.

The electronic commerce point of sale option will lead to new sales opportunities and further reductions in costs of administration, which will, in turn, lead to increased sales. Bill Gates calls this phenomenon "the virtuous circle".

Categories of Goods and Services

There is actually an emerging , additional factor to consider. The point of contact may also be the point of goods and service delivery. Clearly, that is why personal shoppers select and pay on the spot. They wish to take their goods or information home with them. But in the EC market place there is an increasing range of goods and services that can be delivered electronically. To help explain we can simplify the scenario and divide goods and services into "hard goods" and "soft goods". Diagram 4, Hard Goods and Soft Goods illustrates the point.

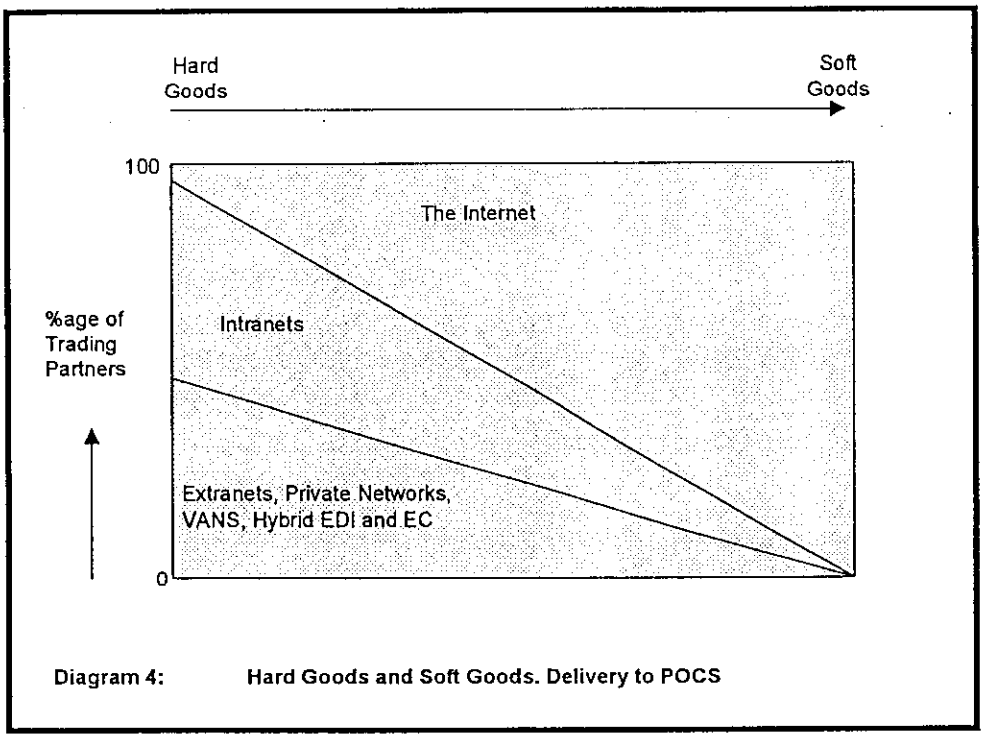


Diagram 4: **Hard Goods and Soft Goods. Delivery to POCS**

For example, no matter how sophisticated EC will become in the next few years most goods will still need to be physically delivered to the home or workplace although EC will soon begin to have a dramatic effect upon order processing, fulfilment, delivery and distribution methods. But there is an increasing range of soft goods that can already be delivered on line. Software, for example, is now almost universally available on-line across the Internet. It saves time and is distinctly cheaper than mailed disks or CD-ROMS. Furthermore, the recipient is personally identified to the vendor, facilitating highly targeted future marketing. The same holds true for electronic publishing; magazines and newspapers are commonly accessed through the Internet. Music and video will follow the same path, as will a range of home entertainment, information and gaming products and services. In the EC sense these are all soft goods. Since payment is also made electronically, delivery is almost simultaneous with ordering. While this may carry instant gratification benefits for consumers it also carries extreme economic, taxation and legislative risks and challenges for governments. Indeed, one popular debate is now: "EC means the end of the nation state. "

Other, more benign soft goods applications, include the delivery of government services such as compliance requests, licenses, tax lodgement and payment. The same is true for "electronic presentment" or telecommunications and public utility billing, payment and enquiries.

The number of examples is growing by the day; imagination is the only inhibitor in most cases. By engaging the concept of hard and soft goods it becomes clear which goods and services, and which of their components are electronically deliverable, and for what benefit.

And now to Electronic Commerce, the 1997 model.

Front Office: Back Office

The widely used current terms used to describe the function of EC are "Business to Consumer" and "Business to Business". The expression "business-to-business" is inexact and sometimes misleading. In EC systems it is not always possible to tell who is accessing the automated point of sale/point of contact. It could be a retail consumer buying in wholesale quantities; it could be a business buying in retail quantities-and many other variants. The term confuses the technological process with the business practise. Therefore this project uses the terms "Front Office" and "Back Office", for brevity and for clarity. Front Office is widely interpreted as the customer interface; Back Office as the supplier interface.

Front Office

The Internet is now entering its third phase. From its inception in 1969 the net has evolved through Email, web browsing and now, transaction processing.

Phase One: Email

For its first 25 years the Internet was used almost exclusively by academics, researchers and US Defense personnel. The original and principal purpose was to exchange technical information by way of file transfer (file transfer protocol or FTP is the name used to describe the manner of exchanging this sort of data today) or now, more typically, by electronic mail (Email).

Phase Two: Web Browsing

Over the last two or three years it has been possible to wander through all of the information contained on the computer files accessible by the Internet (the net) by

using software called browsers, or web browsers. Note: the term "web" is a metaphor for the network of networks which comprise today's Internet construction. Web browsers enable any Internet user to locate and to read any "page" of information that has been given a web address (or URL, Unique Resource Locator). This concept has become known as the world wide web (www). Hence any organisation can now create content on computer files, in any format but generally in attractive, easy to scan and read, multimedia formats. Multimedia implies a combination of text, image, video, graphics and sound. A multimedia web page can contain all of the graphics technology that today's video and TV use. The term "page" is another metaphor, this time for an unlimited amount of information in any multimedia format that can be stored, retrieved and accessed by Internet www technology at a single address.

Phase Three: Transaction Processing

The third phase of the evolution of the Internet is set to become "transaction processing". This means that anyone using the net can actually issue commands or requests to any other computer on the net to follow certain instructions. Home shopping is the most quoted example.

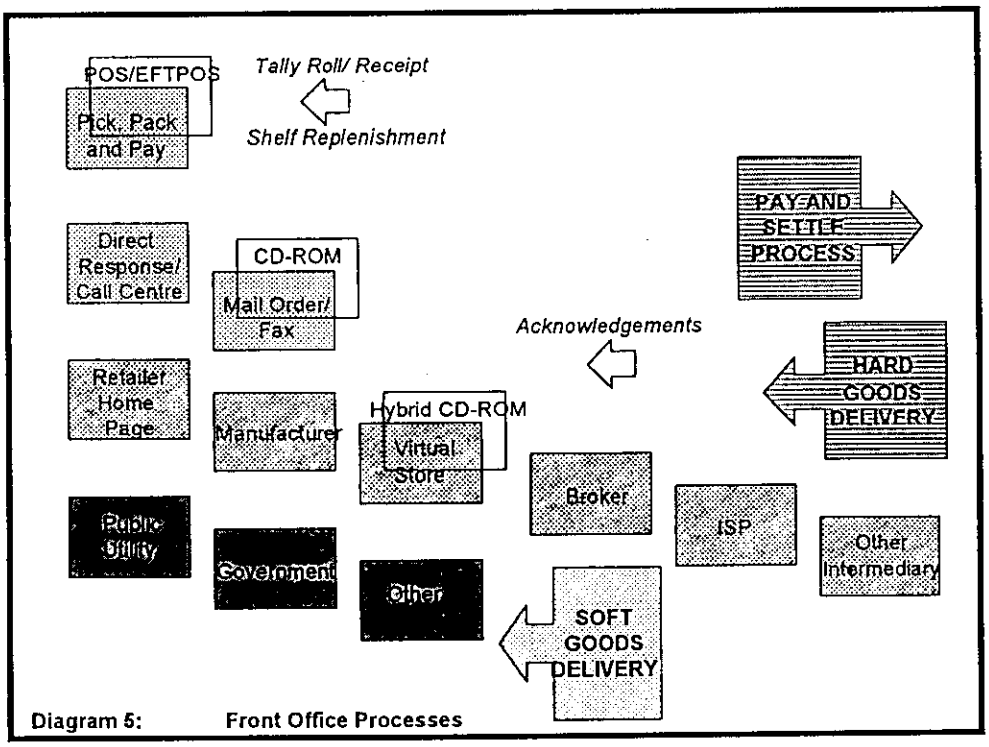


Diagram 5: Front Office Processes

The location of the home page, or the "hosting" of a home page, is the scene of much rapid change and turmoil. As we will see later on, during the discussion of Back Office EC, anyone who is Internet capable can host a page and become a retailer-or

so it would seem. Typical home page hosts include retailers themselves, looking to complement traditional methods of retailing, to provide extra sales outlets or to achieve cost reductions. There are some "virtual retailers" who operate without any physical stores. They just capture the transactions and obtain commissions from the manufacturer, retailer or broker, or anyone else who actually stocks the goods. They may even obtain commissions from the courier or shipper who delivers to the home, for a delivery fee which is added on to the cost of the goods. There is a wide range of other intermediaries striving to capture the transaction, such as Internet Service Providers (ISP). ISP are intermediaries who retail Internet services to the smaller user. The larger users, such as major retailers, will ultimately provide their own Internet hosts, although they may currently use an ISP for convenience.

The means by which a page of information is hosted can be as simple as an ISP offering a hosting service for a fee, or it can be dedicated fault tolerant non-stop computers, or anything in between. The software that these computers utilise to handle the process of home shopping and client services, even of soft goods delivery, is generically known as a "merchant server". The merchant server enables hosting organisations to create web pages, complete with a wide range of graphics techniques, pre prepared artwork and page layout aids. It enables them to create electronic forms (Eforms) for both product and payment; it may enable decryption of secure socket layers (SSL) delivered information. It contains transaction management software and software to integrate with other computer software systems, including back office EDI systems. And these are just the basic functions of a merchant server. Specifications and requirements are developing rapidly.

The merchant server business is currently going through the fledgling phase although there are a few large players already active in the marketplace. Today's vendors include Microsoft, IBM, Lotus, Netscape, SAP, Oracle, Broadvision, Connect, Open Markets, InterWorld, Mercantec, AT&T, GEIS-Actra, BT-MCI (Concert) and products from Mom and Pop shops. Doubtless there will be hundreds of new products announced as the market matures.

Using A Merchant Server

Let us say that a shopper or a services client is connected to the Internet and has a specific home page to find. This may be found either by typing in a URL or by clicking the mouse on encountering a reference to the desired information where indicated by another home page. This information is often displayed in a bright blue coloured typeface, known as "hypertext". By clicking on this blue text the browser is automatically connected to the selected home page. The client can then browse through all of the information on the home page before making a choice.

Taking the case where the shopper finds what he or she is seeking, the next step is to select the item. Each home page will have its own method of selection depending upon marketing methods and page design. However, they all culminate in asking the

shopper to make a selection. Upon making the selection the shopper is then presented with a form to complete. This is often called an electronic form or Eform. The information which accurately describes products or services is automatically entered into the Eform by the merchant server, often via a menu. When completed the information is sent to the computer hosting the home page and its merchant server software. The merchant server will accept the order, or go through any correction routines and resubmission of information. Remember, this is a point of sale device. Information must be complete and wholly accurate if the order is to be properly processed and goods delivered and replenished. When this phase is completed the server acknowledges the order details and confirms acceptance, subject to payment. It may quote delivery/availability details; it may refer the shopper to another page for finance availability, such as for electrical domestic appliances, whitegoods, furniture, computers, and so on. The information captured is then passed on to the back office fulfilment and distribution /administration systems.

Business-to-Employee

A checkpoint on an emerging application area. We are all familiar with buying a T-shirt from the company shop; many companies now allow you to buy using the corporate intranet. A variant from an emulated business-to-consumer application is where employees may have purchases deducted from the payroll, or from allowances. Allowances or entitlements for clothes or equipment are often the norm in the armed services, police, fire services, airlines, banks, health services and so on. Not only do these systems have to keep track of entitlements and usage, but accounts, sizes and up to date measurements, location and other variables. This application promises to be an important hybrid of business-to-consumer and business-to-business.

The Payment Process

The merchant server generally presents the shopper with a form containing details of payment methods acceptable to the merchant. At the moment these are likely to be:

- Account
- Cash on delivery
- Credit card
- Digital cash

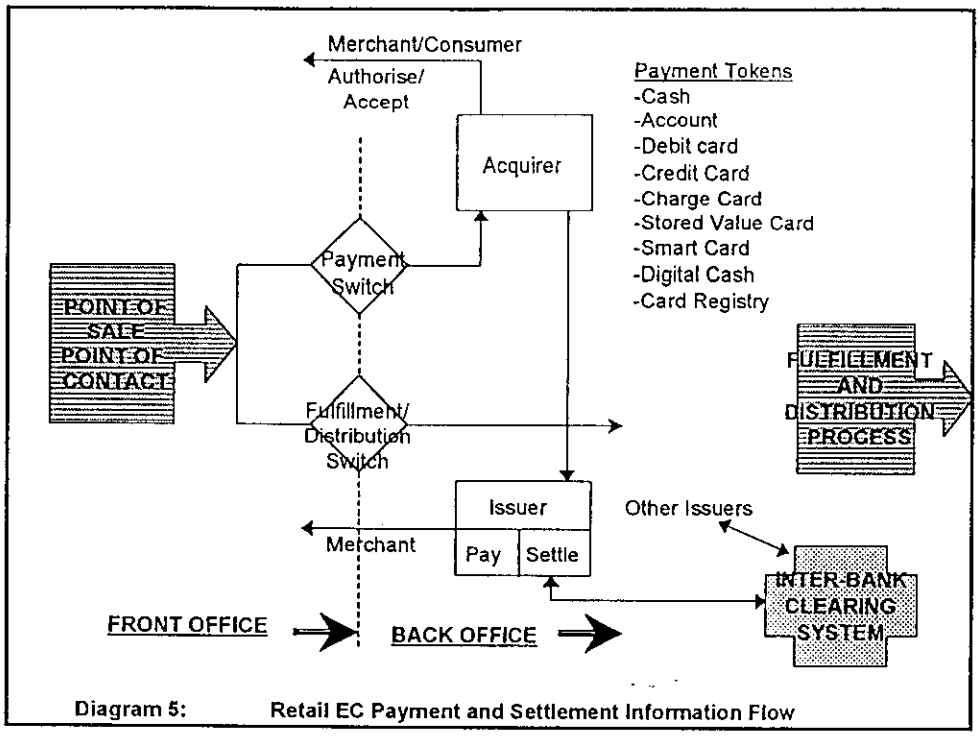


Diagram 5: **Retail EC Payment and Settlement Information Flow**

Diagram 5: Retail Electronic Commerce Point of Sale Payment and Settlement illustrates the range of EC token and payment systems through to Interbank settlement and merchant payment. Note that the cross over point between Front and Back Office systems is where individual transactions are absorbed into corporate and industry systems.

As mentioned earlier, other payment methods are emerging, stored value cards or smart cards for example. Similarly debit cards are an alternative. The difficulty with EC-at the moment-is that all on line payment methods are new and relatively untested. It is vital that the merchant obtains payment at no less favourable terms than he currently does. Similarly the banks involved in the process want to be sure about security and costs of processing the transaction within their existing security and operating restraints. The shopper wants to be confident that the payment is directed to the intended recipient with no possibility of interception or misappropriation, and that the shopper suffers no loss of goods or funds as a consequence of shopping on the Internet.

The most common practice at the moment is that banks treat credit card authorisations and settlements for Internet purchases as MOTO (Mail Order Telephone Order), or "card not present." This means that, due to the bank's belief that the Internet is (pre-SET) inherently insecure and unreliable, the merchant and the consumer take the risk, not the bank. SET (Secure Electronic Transactions, a new "open" banking industry-initiated standard for payments across the Internet) will change this ruling.

It must also be remembered that net shopping is global. It is not possible to limit shopping to national boundaries, apart from using methods that will deter all shoppers. Similarly, because the net is global, merchant servers and payment methods need to operate 24 hours a day, seven days a week, every week. Hence payment methods need not only to be secure, they need to be automated, non stop and foolproof. This requirement limits payment methods at the moment although probably for no more than 12 months at the most.

EC Front Office Summary

So far we have focussed on the point of sale/point of contact. We have attempted to demonstrate that, subject to the removal of some constraints, EC will revolutionise the way that the supply chain presents retail purchasing opportunities to the consumer. It will also impact the ways in which soft goods are delivered to the consumer and the means by which services and a wide range of personal contact-based information is delivered.

There are many issues to be considered in Front Office EC, some of which will inhibit growth, some of which will facilitate and encourage development and adoption. These include:

Everybody Wants To Be A Retailer

Prior to the agrarian and the industrial revolutions all manufactures and produce originated in local communities, from local tradesmen and craftsmen. Traders were the intermediaries between communities; merchants conducted cross-border, river and ocean trade. The industrial revolution started the trend to the division of labour and specialisation, which ultimately led to Taylor's time/method study and work evaluation practises and Ford's assembly lines. At the same time department stores, which offered a wide range of goods were introduced in Paris and were rapidly copied in the US and the rest of Europe. Today's Quick Response and JIT systems are a direct result of the last 150 years evolution of retail-driven supply chain management methods. Electronic Commerce is the latest technology enhancement to this process; it promises the potential to automate all supply chains, no matter what the industry or enterprise may be.

Take the example of one of the southern hemisphere's largest pastoral organisations. The company concerned is a meat industry marketing company, selling processed meat in either retail cuts or in wholesale cuts (primals) to more than 160 different countries. Their main clients are meat buying groups and supermarket chains. They take produce from over 20,000 farms, processed through 10 freezing works (abattoirs/meat packing plants) and then deliver in bulk against contacts agreed up to two years in advance.

participation in the net. The social potential of the technology is at least as important as its economic potential. Service is probably a better outcome for society then sales.

Although they will always deny it, telecommunications operators are struggling to keep up with innovation. There is a direct correlation between Internet usage and costs, the majority of which, over time, are attributable to telecommunications costs. The faster, higher performance network technologies, such as Integrated Services Distribution Network (ISDN), are effectively unavailable to most home users, except, as we shall see, in the US. Local pricing is often set at corporate levels. Last year AT&T in the USA offered ISDN access to home users for US$30 per month and over 18 million users signed up. Charges in other countries can be up to 10 times (including equipment) more than these prices.

Telecommunications companies also have difficulty with the very concept that major data based-systems can run over lines initially installed for voice use only. The Internet has always been a user driven service. For years the telecommunication companies were largely unaware that it was happening around them. Then the www unleashed the latent user potential of the Internet. Telecommunications companies around the world have since been arguing that voice networks cannot cope with the volume and that they need to construct special networks to handle future volumes. Many practitioners believe that this is just code to say that they want to charge differently, and more! In some countries the major telecommunications companies have encouraged legislation that now enables them to charge for timed local calls. Nothing the telecommunication companies are doing will make the Internet any cheaper to use; quite the reverse. Happily, the market will speak loudest and competition will overcome residual monopolistic instincts.

Ironically, in some advanced economies, Internet international traffic already exceeds international voice traffic, after little more than two years of popular adoption. But because the Internet is busy and much of the content needs to be accessed from overseas web sites current line speeds available domestically lead to delays in users obtaining screen displays which leads to loss of interest. Internet shopping is about instant gratification.

Immediacy is the key to commercial success. Which requires affordable and plentiful connection options. Until this situation prevails then the potential of the Internet will remain suppressed.

In many countries there is an oversupply of ISPs, although, I truth, most of them are just access providers, not service providers. This ISP infrastructure is at risk. The market cannot sustain the profitable operations of so many operators at the moment. While competition is leading to choice and lower prices there are bound to be casualties, which will in turn affect businesses and home users alike. US forecasts suggest that their 4,000 ISPs will reduce to less than 50 within five years due to consolidation, new co-operatives and business failures.

The next generation of ISP's should be national and international operators. That means that the net will be accessible through a single telephone number anywhere in the country, probably toll free. In time this will lead to international single number access, so that you can access your service for the cost of a local call anywhere in the world. To achieve that currently you need to dial in to your local ISP wherever you are. International access is therefore time-consuming and expensive. Universal national and international access will cure that but we can expect the first services to be offered by European and US based companies. And when we combine this with new technology telephony (high bandwidth) EC will begin the retailing revolution that this project adumbrates.

Security Issues

Up until very recently EC had been transacted exclusively across private networks, such as bank's proprietary networks and VANS' closed but publicly available networks. In this environment, security is managed by validating existing customers electronic IDs, by validating communication lines IDs, by sophisticated handshaking and conversational software and by insistence upon specific messaging/standards. In addition, trading partner agreements (contracts) spell out the consequences for technology failures, operations errors and fraudulent actions. In the case of interconnection to banking networks, the banks insist upon specific protocols, message sets, encryption (electronic "scrambling and unscrambling") and authentication processes. Management of risk is paramount hence a closed environment is seen to help manage that risk.

Enter the Internet; the ultimate in open systems. But a network of potential clients so large and powerful that no bank or enterprise can afford to ignore it. What to do about security now?

The answer is that, while recognising that the Internet is insecure and unreliable (for the moment) by best practice standards, the application of user ID and passwords, cryptography, hardware security techniques and fully encrypted connections between computers (e.g. the secure socket layer, or SSL, which approximates to a secure "pipe" through which you can transmit information without fear of interception, unauthorised re-routing, tampering or hacking) helps overcome the challenge. We can add the use of electronic signatures (strings of binary characters, unique to an individual), digital certificates, issued by third parties, which guarantee your identity to a third party. And finally, a wide range of hardware and software cryptography systems is increasingly being made economically available. The combination of these technologies is beginning to reassure even the most cynical organisations that the Internet is actually starting to surpass private networks for security standards. Add to this electronic acknowledgements and good IT housekeeping and the Internet becomes a trusted communications medium, as the SET initiatives from Visa, MasterCard and others demonstrate.

Standards

In the IT industry, we have become used to the gradual transition from vendor's proprietary standards to open standards. It goes without saying that Windows95 and NT are now the commodity de facto standards; Unix has many supporters but there is a broad belief that Windows NT, and what follows, will gradually assimilate Unix functionality and their client base. Whilst arguments between the adherents of other operating systems have achieved the status of religious wars, the emphasis is now moving to data standards as opposed to technology standards. For interoperable systems ultimately depend upon being able to understand the information they receive. And in open systems, like the Internet, that means the ability to read any information, from any source, at any time.

EDI standards have set the agenda for these activities, even although the process may be unknown to many of the future standard setting participants. Because standards setting for open systems is essentially a democratic process; open to all for the common good. EDI concentrated on standard messages, such as Purchase Orders, Invoices, etc. By now there are about 1,000 standard EDI messages in the two main standards systems, ANSI and UN/EDIFACT. But these two systems are not interoperable, nor are they compatible, after over 10 years of effort. Hence, standards which make the Internet globally useful will need to learn from past mistakes and set standards with the full complicity of technology vendors and users alike.

Standards have a number of components, setting aside the need for documentation, enforcement, continuous development and promotion. The main components are:

1. compliance, i.e. ensuring that all participants operate to standards as published and updated in accordance with democratic procedures;

2. interoperability, i.e. ensuring that all interpretations of the standards and the products which utilise them can work with all competitive products, such that a particular vendor's implementation is transparent to the end user.

There are many initiatives in progress, in addition to EDI. Open Buying across the Internet (OBI) is just one example. OBI is an initiative (reputedly) started by American Express with the intention of standardising information passed between merchant servers and purchasing card issuers and acquirers. SET is another, ultimately aiming to codify 160 plus messages used to manage the use of credit cards, debit cards and smart cards across the Internet. These, and many other standards initiatives will assume greater profile and importance over the coming years. We have all learned that "lock in" to proprietary standards or systems is ultimately bad commercial practice and only offers short term gains which must be weighed against the potential for systems or business extinction.

A wise man once said "if I let my children go, then I keep them forever; If I try to keep them, then they are lost to me." can

The Back Office

Most inter-enterprise systems development has been carried out in this area, particularly EDI for inventory replenishment, fulfilment, trade, transportation and distribution and payment systems. Diagram 8 illustrates the basic functions of the first part of a back office process.

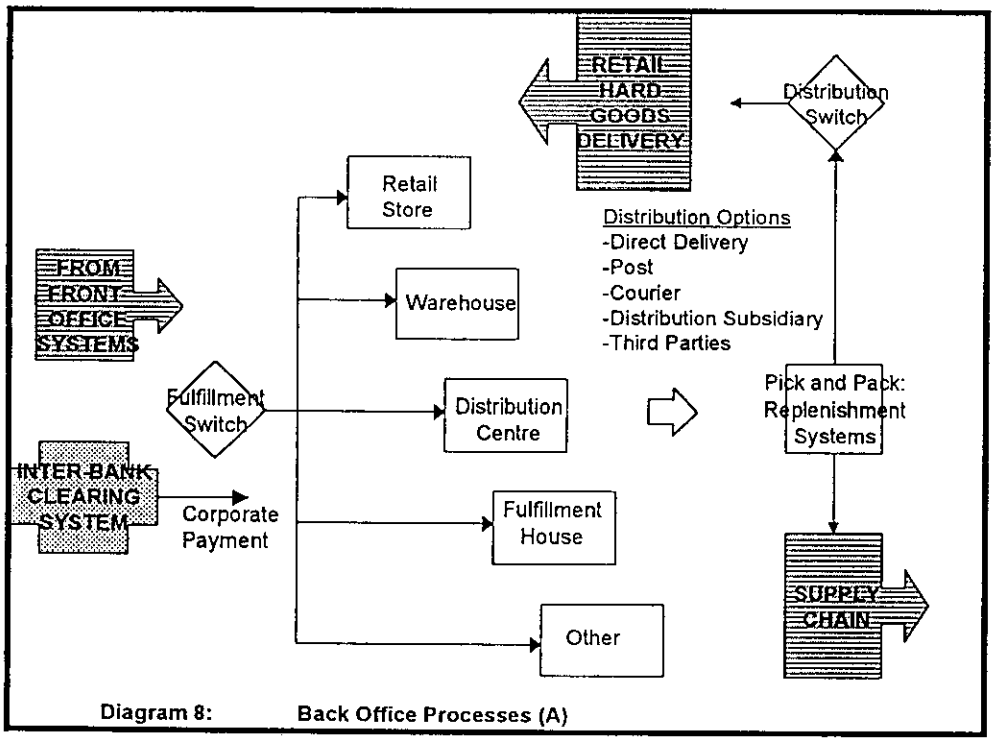


Diagram 8: Back Office Processes (A)

Individual sales/transactions are collected by the merchant server and then switched to the appropriate fulfilment centre. This may be the enterprise's own warehouse, a distribution centre serving the individual merchant or a co-operative DC, it may be a special purpose fulfilment house, a facilities-managed distribution centre(by one of the large courier companies, for instance) or even the postal authority. Items are then picked and packed and delivered to the retail customer by the selected method. Note: This process applies to hard goods. Soft goods take the same route as the order process and may be delivered direct to the consumer as soon as payment has been validated.

Diagram 9 illustrates the remaining part of the back office process, whereby replenishment systems are updated by retail point of sale data. ERP/DRP and MRP systems aggregate point of sale/consumption data to calculate replenishment orders. These orders and associated information are delivered elctronically, normally by EDI, to supply chain trading partners who supply wholesale quantities to the fulfilment centres.

LOC Letter of crEC/EDIt. See **ELC**.

log (logging) The act of centrally recording transactions by the systems management function of an EC/EDI service.

log on To connect to an EC/EDI service by dialling the access number, entering user ID and password, and then being authenticated as a valid user of the system by the EC/EDI server. After a correct log-on, the system is likely to respond with a menu or choice of required actions. Also called *sign on*.

M

MAC Message authentication code. See **message authentication**.

MAF A generic term for Ministry of Agriculture and Fisheries.

mailbox A repository for messages in an electronic mail system or EC/EDI server. Only authorized messages are allowed into mailboxes. The EC/EDI server authenticates each message before depositing the message in the appropriate "pigeonhole" of a mailbox.

mainframe/mini/micro Generic names given according to size or power of a computer. There is no longer any hard and fast rule to determine which is which. One rule of thumb is that a mainframe requires air conditioning and a micro is a PC. Hence everything in between is a mini. Power, measured in millions of instructions per second (mips) is no longer a reliable measure. A better indicator is the type of network servicing the computer, which varies from a full national network under proprietary protocols, to **wide area networks** (WANS) (still geographically restricted, generally to a few thousand feet radius), to **local area networks** (LANS), which are limited to a specific group of desks or offices. Perhaps the most reliable differentiation is the functionality of the operating system.

maintenance agency The accrEC/EDIted standards organization or committee responsible for processing requests for changes or additions to messages, segments, and data elements and procedures. The process is a standard procedure, especially within EC/EDIFACT.

maintenance procedure The authorized process mechanism for requests for changes or additions to EC/EDI messages, data segments, or data elements and related procedures (EC/EDIFACT).

MAN Metropolitan area network; a communication network spanning an approximate 50-km diameter.

mandatory A statement that a data segment, data element, or component element must be used. Used in all translation processes (see **conditional**).

many to many Applied to an EC/EDI network in which many users may talk to many others; leads to **anarchy** without a clearinghouse.

media Storage devices such as tapes (paper or magnetic), floppy disks, disks, even paper.

medium exchange The process of electronic data interchange whereby the data is contained on files (tape or floppy disk normally) and delivered to another trading partner (say by courier) on a regular basis.

Merchant Servers The Internet host (or virtual host) that provides business to consumer and business to business electronic commerce services, across the Internet. It may also be integrated with call centres, fulfilment and distribution centres, payment services, track and trace services and data warehousing services to provide a full electronic commerce service for traders and trader information.

Mercury Communications (Owned by C&W). The deregulated British carrier, set up to compete with British Telecom (**BT**).

message Generally unstructured text, but an EC/EDI document also qualifies as a message. Messaging is a generic term for the electronic mail family of services. Also, an ordered series of characters intended to convey information (ISO 2382/16). In EC/EDIFACT, a set of segments in the order specified in a message directory starting with the message header and ending with the message trailer.

message authentication The process involving encryption. Ensures that only authorized originators and recipients exchange messages.

message code A unique reference identifying a message type in EC/EDIFACT.

message directory Directory of standard messages. All standards use these and data dictionaries. Also, a listing of identified, named, described, and specified message types.

message handling services (MHS) The generic term applied to the X.400-facilitated services currently being planned (already implemented in some countries).

message header segment Service segment starting and uniquely identifying a message in EC/EDIFACT.

message standard The sequence, attributes, and usage of data elements within a message. Used in all document standards and in **SITA; SWIFT;** etc.

nesting A technique of locating a segment or segments in a precise hierarchical position with respect to another segment. Used in programming and standards setting.

nesting identifier Number used to explicitly identify level and sequence of the repeat of a data segment in a nested relationship.

nesting level The position of a segment in a nested relationship.

network A physical structure of telecommunication access paths (circuits between different end users). A network may be point-to-point, i.e., a fixed line between two access points, thus forcing data to take prescribed paths. It may be a switched network, where computers in the network calculate the optimum data path. It may also be an intelligent (software-defined) network, capable of the functions of a switched network, of integrating various other networks and computers, and of optimizing pathways, times, and costs. It may also be a packet switched network, where data is assembled into packets (which may be a collection of data from various sources). The nodes in this case are PADS (packet assembly and disassembly switches), which control the connect switches and the correct sequence and routings of data packets in a software-defined network.

network management The overall supervision of the equipment and the performance of a network.

NIST U.S. National Institute of Standards and Technology, supersedes NBS.

Nixdorf A West German computer manufacturer.

node An access point in a network. See **PAD**.

NPSI An IBM proprietary product, network processor systems interface. Enables SNA to communicate with a public packet switched network.

NSA National Security Administration (USA). Involved in setting/ enforcing data encryption standards. ANSI committee X9.9 is now taking over the responsibility for encryption standards for public systems while NSA concentrates upon military needs. **DES** was originally overseen by the US National Bureau of Standards. See **Data Encryption Standard**.

numeric character set A character set that contains digits and may contain control and special characters but no letters (ISO 2382/4).

O

octet A unit of storage comprising 8 bits. Packets of data can be switched in octet units.

ODETTE Organization for Data by Telegraphic Transfer within Europe. The original French has it: Organisation du Donnees Echanges par Teletransmission en Europe. ODETTE was formed to implement EC/EDI in the European auto industry.

omission Exclusion of conditional units of data prescribed in a message type when used in an actual application.

one to many Applied to a system in which a hub or central company connects to a range of trading partners, who do not in turn trade with anyone else within that network. See **hub, broadcast, honeypot**.

one to one Applied to a point-to-point relationship, in a network, involving two trading partners.

on line Applied to a terminal or computer actively connected to a computer, either directly or through a network.

open-routed network A switched network that has already set up the send-to-receive pathway, or a network between those points that is permanently open.

operating system The "brain" software which controls computer operations, input/output, data management, and resource scheduling.

ORDCHG An EC/EDIFACT message. Purchase order change.

ORDERS An EC/EDIFACT message. Purchase order message.

ORDRSP An EC/EDIFACT message. Purchase order response.

OSI Open Systems Interconnection. A general-purpose standard architecture leading to application-to-application communication.

P

packet A sequence of data structured to a format defined by CCITT X.25 recommendations.

packet switching Switching by using **PAD** units to assemble data into packets, switch packets over a circuit completed merely for the duration of the call (during which packets of data are transmitted to the next node in the network), and disassemble the packets. X.25 is the CCITT recommendation which covers packet switching.

PAD Packet assembly and disassembly. See **network, packet switching**.

paperless payment See **EFT; EFTPOS**.

paperless trading **EC/EDI**, the process of exchanging trading documents electronically. Supported by messaging and various other electronic network services.

parallel processing The use of several processors within a single computer system to facilitate **fault-tolerant** processing. Occasionally called nonstop processing.

parallel running The simultaneous use of two systems (paper and electronic), to enable one to check the other.

parity checking An error checking technique used in programming and data communication to ensure receipt of complete and valid data.

partner to partner relationship The new electronic (paperless) trading relationship between trading partners in an EC/EDI network.

passthrough Access of data to a network by travelling across another network via gateways.

password A unique, generally six-digit, word which identifies a specific EC/EDI end user to the system. A user ID, system validation, and authentication must also be satisfactorily entered and processed and then accepted by the system before messages can be sent or received. The messages themselves are subject to compliance checking.

payment instruments Checks, **EFT, EFTPOS**, credit/debit notes, credit memos, letters of credit, etc. **Value exchange** is the generic term for this process of replacing money with new technology tokens.

payment terms In the EC/EDI context, the time delay between the acceptance of a valid (electronic) delivery document and the specific time/data at which money is received in the trading partner's account. Not the traditional payment terms, e.g., 7, 14, or 28 days net. Because of the benefits of electronic trading, this period may be reduced to a few days instead of the accumulation of: (1) time to enter and approve an invoice; (2) normal payment delay; and (3) delay between payment approval and funds receipt. In the future this process will involve principles such as unchecked receipt of goods (i.e., **assumed receipt**) and elimination of invoices.

PC Personal computer.

PCB Printed circuit board (card). Often shown in lowercase, i.e., pcb.
PE UK Customs period entry declaration data entry service.

Pedi A mnemonic for the committee work under way to integrate EC/EDI requirements into X.400 standards.

Performance Standards An agreed set of standards or measurements against which a supplier's performance may be measured. It may include price, time, quality standards and a range of specific deliverables, pre agreed by both parties.

pilot systems An EC/EDI system in the initial testing phase, performed by perhaps just two trading partners. Pilot tests are utilized to check connectivity, document standards, speed, and internal systems.

pixel An individual dot, which can be in eight levels of halftone, which goes to make up a screen-based character or a scanned image on a laser printer or fax.

PNA See **ANA, EAN**.

point to point See **network; one to one**.

polling A communication control procedure by which a computer periodically interrogates nodes in the network, or terminals, to establish if they wish to gain access to the network.

port The physical access point within a communication controller.

ported Software developed for a particular computer which has been rewritten for a different computer is said to have been *ported* to the new computer.

Post Event Auditing The process whereby goods are pre cleared and immediately delivered to the buyer (or the importer), even when subject to technical controls or other reasons for physical inspections. Physical inspection may then take place on the importer's/buyer's premises together with a document audit. This may take place after every transaction or selectively, depending on the level of risk management deployed.

post office The original name in many countries for the PTT (posts, telegraph, and telephone) authority. UK, Germany, Australia, and New Zealand, among many others, had a post office as the initial supervising authority, before breaking it up into separate authorities for posts and telecommunication. Even today, with current technology, the definitions can become blurred.

POTS Plain old telephone service. Voice services.

Pre Authorisation/ Pre Approval See pre clearance. Applied to formalities and technical controls rather than the goods themselves.

Pre Clearance The approval of formalities and channel selection before the goods are presented to Customs for inspection. Pre clearance is also applied to some international passenger travel, especially by sea. Customs formalities can be completed on board, before arrival. Air passenger pre clearance is now commonplace on Pacific routes. It deploys an EDI message called PAXLST (Electronic Passenger Manifest) so that incoming Customs and Immigration authorities may scrutinise passenger details before they arrive, and therefore clear them immediately on arrival.

private domain In X.400, applied to those networks which provide in-house word processing and in-house electronic mail. See **domain; public domain**.

Pre Event Auditing See post event auditing. Goods are inspected and/or paperwork audited before they leave an exporter's premises, in time for scheduled export.

Pre Shipment Inspection (PSI) The process of inspecting or evaluating goods at source, before they are exported from the country of origin. The PSI organisation validates specifications, function, provenance, invoice and price details, quality and quantity (depending on their contract), prior to export. It then allocates a certificate of conformance (COC) to the goods, for the benefit of the importing technical control organisation.

Expense and reliability perceptions make this an unpopular course of action for many categories of goods.

private formats Where a **honeypot** or major company intends to implement EC/EDI only with its own suppliers and customers, it may decide not to implement an industry document standard. In this case it develops something unique for the company or just utilizes an electronic envelope for transactions. See **electronic envelope**.

private key A unique key, assigned to only one entity in a data encryption system.

private line A nonswitched circuit, leased from the PTT.

private network A proprietary network established for a specific in-house purpose; not available to other users.

product numbering association See **ANA, EAN**.

progressive data transfer A technique allowing a sender to transfer data, as it becomes available, to the recipient who creates, for this purpose, a business file. Each transfer is linked by common access reference data.

protocol The set of rules which defines the way in which information can flow within a computer or communication system. A protocol comprises: syntax: commands and responses; semantics: the structured set of requests

and actions permissible by each user; and timing: types of events and sequences.

protocol conversion The process of enabling systems to communicate with systems operating under a different communication protocol. Such protocols include **SNA** and **OSI**.

PSI Pre shipment inspection.

PSTN Public switched telephone network. The backbone, basic telephone network and service, publicly offered by the PTT. See **POTS**.

PTT Posts, telephone, and telegraph. The legal entity set up to operate these services in a given country. Now generally separated into postal and telephone/telecommunication authorities. See **deregulation**.

public domain In X.400, applied to gateways between the networks of public service providers for such things as electronic mail. See **domain; private domain**.

public key A publicly available key which, in connection with a private key, can provide an extra level of addressing and identifying in an encryption system.

Q

QALITY An EC/EDIFACT message. Quality data message.

QR Quick Response (systems). The use of EC/EDI with data bases, bar coding, container and goods coding, and universal product codes in fast-moving retail, apparel, and other industries. See also **ECR**.

qualified data element A data element whose precise meaning is conveyed by an associated **qualifier**.

qualifier An element of data that gives a **qualified data element** or segment a specific meaning. An EC/EDIFACT term.

qualifier code list A list of qualifier values. An EC/EDIFACT term.

queue Any group of items, e.g., jobs or packets, which are waiting for service by a processor. The act of sequencing for the next process.

R

RACE R&D into Advanced Communications for Europe (an EC programme).

ramping The process of adding many new users onto a system.

rapporteur Person who prepares an account of proceedings of a committee for a higher body (OED). Specifically applied to the EC/EDIFACT organization here, but may be generally applied to any UN activity.

RBOC Regional Bell operating company.

read only Applied to a service in which information can only be read from a screen or printer. The information cannot be altered, nor can responding data be sent back down the line to the sending computer.

real time The usually brief time for data to be entered and processed during an interactive session. See **interactive processing**.

receiver (receiving computer) A (temporarily) passive computer in an EC/EDI network. The computer which receives or retrieves EC/EDI documents, directly or via a mailbox.

redundant Applied to data within a message which may be eliminated without affecting the essential information.

regulations The rules drawn up by the PTT under the umbrella of the various telecommunication acts. See **legislation, deregulation**.

reject To refuse a document if, when checked for validation/authentication and standards compliance, it fails to meet the test. The document is rejected and the originator informed. Rejected documents and transactions are recorded in a log.

release character A character used to restore to its original meaning any character used as syntactical separator.

remote job entry The submission of jobs by using a device connected to the processing computer by a data link or network. IBM 2780, 3780 are remote job entry devices. Known as **RJE**.

remote support Technical and systems assistance provided over a telephone or a terminal. This is now typically the first level of support in an EC/EDI system. See **help desk**.

repeating segment A segment which may repeat in a message as indicated in the relevant message specification.

replenishment cycle Apropos JIT inventory control, time between ordering stock and receiving it, with allowance for usage during the time taken for order entry, manufacturing, and delivery.

reroute The action of sending data to a different node (or network of nodes) in a circuit if the original route is obstructed or unusable.

reseller A sales and support organization that buys a service wholesale from a major service provider (e.g., a telco, PTT, or carrier) and provides support to end users in return for a markup on PTT wholesale prices to end users of the service.

resource usage A billing method based upon actual usage of computer, network, storage, etc.

retransmit To continue to attempt transmission when, because of line failures, data corruption, atmospheric conditions, etc., it is not possible to send data over a network on the first attempt.

RFI Request for information, a formal tendering process. The next step after a requirements specification.

RFP Request for proposal. Usually follows an **RFI**. Interchangeable with **RFT**.

RFT Request for tender. The next step after an **RFI**.

RFW Request for work. A document form or procedure used in some industries as the internal trigger to create a new design or custom design for a product.

RHC Regional holding company. Created by the deregulation and splitting up of AT&T into the Bell RHCs. See **telco, PTT**. Also known as RBOC, regional Bell operating company.

RJE **Remote job entry**.

Risk Management The use of computer records and selectivity to decide the level of risk of a certain event happening. For example, a trader might export certain categories of goods every month, and may have done so for years. Even though the goods are subject to technical controls that particular trader might never have been found to have flouted the regulations. In short, he is a good corporate citizen. In this case the computer may only select red channel for post/pre event auditing on one occasion in ten, for example, depending on the algorithms or computer logic used by the Customs system.

The same rationale may be used for traders, for goods categories or HS numbers, for destination country (or supplying country), for suppliers, for times of the year, for carrier, and so on. As experience is built up and as results are compared to computer selections, as the selectivity criteria are refined, then risk management becomes a very effective tool for control. See Appendix for paper on risk management.

RSA The abbreviation for Rivost, Shamir, Aldeman, the developers of an asymmetrical public key encryption system.

S

SAD Single administrative document. The official export, transit and import customs form for international trade. Introduced in the EEC on 1 January, 1988. Also used between EC and EFTA.

SAGITTA A national Dutch customs clearance system.

SCP Simplified clearance procedure (for UK exports).

SDLC Synchronous data link control. An industry standard data communication technique. SDLC is a subset of HDLC, originally developed by IBM. See **HDLC; IBM 3270, 2780/3780.**

SEAGHA System for Electronic and Adopted Interchange in the Port of Antwerp, Belgium.

section control segment A service segment used within the EC/EDIFACT standards to separate header, detail, and summary sections of a message where necessary to avoid ambiguities in the message segment content.

security A generic term generally describing the methods adopted to protect data from loss, corruption, and unauthorized access and retrieval. Methods used include **passwords**, **ID** numbers, authorization, **verification** of message/document type/mailbox address, **validation** of document type and contents, verification of line ID, **callback** to sender, and message **time-out**. Encryption is to be used in some trading networks.

security fence The term given to security procedures in mailbox, EC/EDI, and other network-based systems.

segment A predefined and identified set of normally functionally related data elements which are identified by their sequential positions within the set. A segment starts with a segment tag and ends with a segment terminator. It can be a service or a user data segment. An EC/EDIFACT term.

segment code A code which uniquely identifies each segment as specified in a segment directory. An EC/EDIFACT term.

segment directory A listing of identified, named, described and specified segments.

segment name One or more words identifying a data segment concept. An EC/EDIFACT term.

segment qualifier See **qualifier**.

segment specifications The contents, structure, and attribute of a segment. An EC/EDIFACT term.

segment tag A composite data element, in which the first component data element contains a code which uniquely identifies a segment as specified in the relevant segment directory. Additional component data elements can be conditionally used to indicate the hierarchical level and nesting relation in a message and the incidence of repetition of a segment.

segment terminator The syntax character which is used to identify the end of a segment. An EC/EDIFACT term.

Self Certification The process of setting and testing performance and quality standards. Self certification is undertaken internally within an organisation but to internationally recognised standards. Self regulating organisations are regularly audited by external authorities.

Self Certification The process of setting and testing performance and quality standards. Self certification is undertaken internally within an organisation but to internationally recognised standards. Self regulating organisations are regularly audited by external authorities.

send To transmit data.

separator character A character used for syntactical separation of data.

server The computer at the heart of an EC/EDI system. See **EC/EDI server; mailbox**.

service data element A data element used in service segments.

service segment A segment required to service the interchange of user data. An EC/EDIFACT term.

service string advice A character string at the beginning of an interchange defining the syntactically delimiting characters and indicators used in the interchange.

service vendor See **vendor**.

session See **communication session**.

SHIPNET A network for EC/EDI in international trade, specific to the freight carriage and forwarding industry.

sign on See **log on**.

simple data element A data element whose data item representation embodies a single concept, i.e., a data element which is not made up of component data elements.

simple segment A segment which requires no qualification, i.e., whose meaning is fixed and explicit.

SiSTEMI TeLEMATICA A VAN for the port of Genoa, Italy.

SITA Système Internationale Transport Aèrienne (or Aèronautique), an organization that provides all of the communication and message switching services between international airlines. SITA is actually a **VAN**, since most of the application tasks are performed by the computers belonging to the airlines themselves—SITA's membership. SITA is represented on EC/EDIFACT committees.

SITPRO An acronym for Simpler International Trade Procedures. Originally set up as a department within the British Department of Trade and Industry, but now operates commercially. SITPRO's task was to design a universal set of documents for use by British industry involved in import/export. It now offers software for document translation and is represented on EC/EDIFACT committees.

SMMT The (UK) Society of Motor Manufacturers and Traders, the organization which represents British auto manufacturers. SMMT commissioned the first auto-specific EC/EDI scheme, in close coordination with ODETTE.

SNA Systems Network Architecture. An IBM proprietary communication protocol. Although a de facto standard, employed by 30,000 IBM hosts around the world, for many years SNA did not yet conform to ISO standards as does OSI. Indeed it had some trouble connecting to X.25 networks, since SNA was developed on the basis that it would be talking only to IBM hosts, with leased lines between them. Since X.25 employs dial-up as well as leased lines, for the switching of data packets it needs to poll nodes. Sophisticated additional software is required by an IBM communication controller to use an X.25 packet switched network, enabling SNA to operate within a polling environment. See **NPSI, polling, X.25**.

SOFI (1 and 2) A French equivalent of the UK Customs CHIEF system.

software-defined network See **network**.

special interest group See **common interest group; common user group**.

SPIC Simplified Procedure for Import Clearance (part of DEPS).

standard level The specific release level of a standard, effective at a given date. A new release occurs once or twice a year.

standards The rules which are laid down to enable incompatible computers and communication systems to exchange information and to enable document types to be exchanged. See **ANSI, CCITT, document standards**.

store and forward The term commonly applied to a messaging (e.g., electronic mail) system where a message is stored before delivery to a third party. The term implies that the mailbox system itself performs delivery to the addressee, i.e., direct delivery. This is the key difference between *store and forward* and *store and retrieve*. In point of fact most mailbox systems allow retrieval and perform direct delivery. Provided there is a time delay induced by the mailbox system, they are both acceptable services under most telecommunication regimes.

store and retrieve Applied to a system in which a message is sent to a mailbox and resides there until retrieved by the addressee, or possibly by being purged to an archive file if the message lies dormant for, say, 4 weeks. Purging routines vary with the system being used.

suite (of programs) A series of computer programs which interact with each other.

summary area The portion of the message which follows the body of the message and which contains summary information relating to the entire message.

supply cycle The lead time between placing one order and the next. See **JIT, QR and ECR**.

support The assistance necessary to install, test, and fully implement a system. Support includes consultancy advice, software provision and installation, education, training, fault diagnosis and correction, help desk, and so on. Not everyone needs "cradle to grave" support, but, in the early stages of EC/EDI, more rather than less support is likely to be necessary.

SWIFT Society for Worldwide Interbank Financial Telecommunications. SWIFT is a VAN originally set up by banks for the purpose of international EFT. SWIFT now has something of the order of 3000 members waiting to use its SWIFT II upgraded network and systems. SWIFT progressed from being a telex-type EFT interchange system to a full-fledged multidocument (financial) EC/EDI system. It has codified over 150 message types.

switched network See **network**.

sync (synchronous) A clock-controlled method of data transmission for use in high-speed circuits or networks. See **bisync, async**.

syntax rules Rules governing the structure of an interchange and its functional groups, messages, segments, and data elements.

system administration The function of allocating mailbox addresses, user ID, passwords; checking security routines; bulk printing; conducting audit routines; housekeeping; gathering statistics; billing; etc.

system interconnect See **network; integration**.

systems integration See **network**.

systems management The tasks involved in keeping a network in service and providing access to valid users. It also involves security, logging, and providing statistics, billing, and central services such as printing. It embraces **systems administration** within its function.

systems study A review of existing internal methods of operation (e.g., how purchase orders are raised and authorized) to set the scene for anticipated changes induced by paperless methods of performing the same task. Changes will include clerical tasks, job functions, computer systems, possibly even office locations.

T

table-driven program A program in which the factors, variables, data, etc. to be used are looked up from a table or matrix, held on a file or in memory.

tag A unique identifier for a segment or data element. An EC/EDIFACT term.

target computer The computer for which a specific message or file is intended. In EC/EDI systems this could be sent direct from computer to computer or via the intermEC/EDIary of a mailbox system. Data volumes determine the method used. See **host to host**.

TARIC The EC's Integrated Customs Tariff, based on HS. See **EC, HS**.

TC 154 Technical Committee 154, a UN committee affiliated with **UNECE WP.4** for the purpose of agreeing on EC/EDIFACT document standards through ISO.

TDCC Transportation Data Coordinating Committee. An early (1960s) standards-setting committee, established to assist American transportation modes coordinate EC/EDI standards for air, motor, rail, and ocean transportation.

TDED UNECE Trade Data Elements Directory.

TDI Trade Data Interchange, directory developed by UNECE. See **GTDI**.

TDL A Scandinavian trade facilitation organization.

TEC/EDIS An EC and EFTA programme to promote the use of EC/EDI. Trade Electronic Data Interchange System.

telco An American acronym for telephone company (i.e., a **carrier** or **PTT**). Basically the national, regulated carrier or (now) in the case of the US, since the breakup at AT&T, an **RHC** (or "Baby Bell"). See **deregulation**.

Telecom Gold British Telecom electronic mail and X.400 messaging systems.

telecommunication (Also **comms** or **telecoms**). The use of a network for the transmission of voice, data, or image. All that is implied by the switching process. The generic name for remote communication using modern technologies. To paraphrase the *Penguin Dictionary of Telecommunications*: "Communication between two people using equipment to overcome the effects caused by distance or physical barriers between them."

telegraph; telegraphy Terms used to denote earlier forms of alphabetic (nonvoice) messaging over a communication network, such as wire telegraphs, telegrams, telex. Uses a limited character set. See **baud, baudot**.

telematics The technological area of overlap between data processing and data communications.

telemetry The science of transmitting electrical measurements over networks to remote systems for recording and analysis.

telephony The engineering science of converting voice into electrical signals and reconverting them to voice.

teleprinter A printer used (now) generally remotely as a telegraph, telex, or limited-character-set printer. Early computers used them as consoles and system printers.

teletex An attempt to provide a "black box" approach to solving the problems of incompatible devices, e.g., word processors. New network and software technology, together with standards development, has caused a very low acceptance rate of teletex services.

telex Probably, after the telegram, the longest-lived network data service. There are still around 2 million telex machines in use today but they are gradually being replaced by fax and advanced network services, such as **EC/EDI** and **MHS**. See **telegraph**.

telex refiler A service for telex users in which someone in, say, Australia wishing to send a telex to an overseas destination first sends it to a host

system (the refilers) in, say, Sydney. The refiler will then batch together all telexes to go to a particular country, say the US, and then send them to its computer in the US, where they are distributed over the local telex network. It has the effect of reducing telex costs to the end user, but there can be disadvantages, especially in the area of **call back**, hence in legal validity.

terminal A point where data can either enter or leave the network. See **DCE, DTE**.

time charging A method of charging for the use of network which calculates charges on the basis of network connect time rather than a flat fee.

time delay system A network-based system where, as a consequence of adding value to a message, a time delay is added. For example, EC/EDI or a mailbox electronic mail system.

time-out Occurs when the time limit established for a certain action, e.g., receipt of a message, has been exceeded. The message is rejected and the end user is so informed. Some systems allow only a certain time between accessing a mailbox and sending a message. If the mailbox is open for, say, 5 minutes, and a message has still not been sent, the computer will disconnect the mailbox with an appropriate message to the terminal operator. This is for both security and economic reasons.

time-sharing The original term given in the late 1950s – early 1960s to the technique which enables multiple users to simultaneously access a large computer without being aware (or concerned) that other people were using it at the same time. As the cost of computing declined, especially after the PC was introduced, time-sharing services gradually fell from favor, but with mailbox services, MHS, EC/EDI, and the like, time-sharing principles—especially their operating systems—have made a comeback.

time slot The time set by communicating computers during which they will exchange data.

TPA see **trading partner agreement**.

Tradacoms Message standards for data interchange between major UK retailers and their suppliers. Developed by the **ANA**, it uses UN/EDIFACT (now EANCOM) syntax standards.

trade clusters A grouping of interested trading partners, generally for international trade. See **trade facilitation**.

trade facilitation The generic description applied to EC/EDI systems involved in import/export. See **additive trading relationships**.

value-added network services (VAN[S]) The computers and networks which enable any agency or trading partner to establish an indirect connection (via a mailbox) between their computer systems and those of their trading partners in order to exchange formatted messages used in the trade process. A VAN is compatible with all current technologies. It facilitates the secure exchange of messages between trading partners. It maintains billing systems, audit trails, backup, archives and performs checks on incoming messages to ensure that they are to/from registered trading partners, that they conform to approved standards, for specific transaction and message sets, for specific trading partners.

value-added service (VAS) An early name for VADS; VAS can apply to voice, data, and image services. Broadly speaking, only data VAS (VADS) is approved in most countries at the moment.

value exchange In context with **goods movement** and **information exchange**, this term refers to the payment cycle and new payment methods.

VAN Value-added network.

VAS Value-added service.

vapourware A nonexistent software product; "blue sky". See **futures**.

vendor The commonly accepted computer/electronics jargon for *sales organization*. Hence IBM is a computer vendor, a PTT is a service vendor.

verification See **compliance checking, validation**.

version number Number used to identify the particular release or version of a standard. Can also widely be applied to software, to standards, and to documentation.

VICS Voluntary interindustry communication standards, document standards in use by supermarkets, retail industries, etc. Particularly espoused by the QRS advocates.

videotex A screen-based, full-color, basically read-only network service. Useful because it uses cheap and readily available equipment, e.g., converted TV sets. Used for on-line financial information, such as currency exchange rates. Most widely used in travel agency/tourism applications. Drawbacks include lack of security and slow transmission rates (1200/75 baud). Another VADS, provided by the PTT in many countries. Standards coordinated by CEPT. *Note:* Videotex is known, confusingly, as teletext in New Zealand. Teletex has an entirely different meaning elsewhere. See **teletex**.

V.Series A series of recommendations by CCITT governing data transmission over telephone circuits.

W

WAN Wide area network; a network connecting terminals and computers within a few thousand feet. See **mainframe/mini/micro**.

WATS Wide area telephone service, a telco service. Includes in-WATS (or 800 service) and out-WATS, calls from a central location.

WCO World Customs Organisation. Formerly known as CCC (Customs Cooperation Council).

WINS An X12 subset. Warehouse Information Network Standards. Applies to grocery warehouses and refrigeration warehouse document standards. See **ANSI; UCS**.

wire services News services, originally based on telex but now screen-based. Service providers include Reuters, AP, UPI, etc.

workstation A personal computer or a terminal, that enables an end user to communicate with the network and the service provider.

WP.4 See **UNECE WP.4**.

X

X.Series A confusing label. X applies to either a committee setting a standard or the standard itself. For example, ANSI has, among many, the following committees: X3 for FORTRAN upgrades, X9.9 for data encryption standards, and X12 for EC/EDI. CCITT has X.25 for communication recommendations and has X.400 for messaging recommendations. The X followed by a dot refers to CCITT recommendations. The absence of a dot implies an ANSI ASC committee prefix. See **ANSI; CCITT; ISO**. *Note:* ISO has its own series of alternate numbers for CCITT recommendations.

X modem A protocol used in conjunction with a PC to protect the transmission of data across a dialled-up line. Also called X.PC by some network operators.