Appendix 5: United Nations Directories for Electronic Data Interchange for Administration, Commerce and Transport

(Directory D.97B)

MESSAGE TYPE DIRECTORY EDMD

1. Index of message types by code

Change indicators

a plus sign (+)	for an addition
an asterisk (*)	for an amendment to structure
a hash sign (#)	for changes to names
a vertical bar (|)	for changes to text for descriptions, notes and functions
a minus sign (-)	for a deletion
an X sign (X)	for marked for deletion
a letter R (R)	for a message whose structure has been completely recast. No other change symbols shall be used with this message

	Code	Name	Version	Rev
*	APERAK	Application error and acknowledgement message	D	3
	AUTHOR	Authorization message	D	2
	BANSTA	Banking status message	D	2
*	BAPLIE	Bayplan/stowage plan occupied and empty locations message	D	5
*	BAPLTE	Bayplan/stowage plan total numbers message	D	5
	BOPBNK	Bank transactions and portfolio transactions report message	D	2
	BOPCUS	Balance of payment customer transaction report message	D	1
	BOPDIR	Direct balance of payment declaration message	D	2
	BOPINF	Balance of payment information from customer message	D	2
	CALINF	Vessel call information message	D	2
	CASINT	Request for legal administration action in civil proceedings message	D	1
	CASRES	Legal administration response in civil proceedings message	D	1
*	COARRI	Container discharge/loading report message	D	4
*	CODECO	Container gate-in/gate-out report message	D	4
	CODENO	Permit expiration/clearance ready notice message	D	3
	COEDOR	Container stock report message	D	3
*	COHAOR	Container special handling order message	D	4
+	COLREQ	Request for a documentary collection message	D	1
	COMDIS	Commercial dispute message	D	1
	CONAPW	Advice on pending works message	D	1
	CONDPV	Direct payment valuation message	D	2
	CONDRA	Drawing administration message	D	2
	CONDRO	Drawing organisation message	D	1
	CONEST	Establishment of contract message	D	3
	CONITT	Invitation to tender message	D	3
	CONPVA	Payment valuation message	D	2
	CONQVA	Quantity valuation message	D	1
	CONRPW	Response of pending works message	D	1
	CONTEN	Tender message	D	3
	CONWQD	Work item quantity determination message	D	1
*	COPARN	Container announcement message	D	4
*	COPINO	Container pre-notification message	D	4
*	COPRAR	Container discharge/loading order message	D	4

*	COREOR	Container release order message	D	4
	COSTCO	Container stuffing/stripping confirmation message	D	3
	COSTOR	Container stuffing/stripping order message	D	3
	CREADV	Credit advice message	D	2
	CREEXT	Extended credit advice message	D	2
	CREMUL	Multiple credit advice message	D	1
*|	CUSCAR	Customs cargo report message	D	7
	CUSDEC	Customs declaration message	D	4
	CUSEXP	Customs express consignment declaration message	D	2
+	CUSPED	Periodic customs declaration message	D	1
*	CUSREP	Customs conveyance report message	D	3
*	CUSRES	Customs response message	D	4
	DEBADV	Debit advice message	D	2
	DEBMUL	Multiple debit advice message	D	1
	DELFOR	Delivery schedule message	D	3
	DELJIT	Delivery just in time message	D	3
	DESADV	Despatch advice message	D	6
	DESTIM	Equipment damage and repair estimate message	D	1
	DGRECA	Dangerous goods recapitulation message	D	1
	DIRDEB	Direct debit message	D	3
	DIRDEF	Directory definition message	D	2
R	DOCADV	Documentary credit advice message	D	3
R	DOCAMA	Advice of an amendment of a documentary credit message	D	2
R	DOCAMI	Documentary credit amendment information message	D	2
R	DOCAMR	Request for an amendment of a documentary credit message	D	2
R	DOCAPP	Documentary credit application message	D	3
|	DOCARE	Response to an amendment of a documentary credit message	D	2
*|	DOCINF	Documentary credit issuance information message	D	3
	FINCAN	Financial cancellation message	D	1
	FINSTA	Financial statement of an account message	D	1
|	GENRAL	General purpose message	D	2
	GESMES	Generic statistical message	D	1
*	HANMOV	Cargo/goods handling and movement message	D	3
*	IFCSUM	Forwarding and consolidation summary message	D	7
*	IFTCCA	Forwarding and transport shipment charge calculation message	D	3
	IFTDGN	Dangerous goods notification message	D	3
	IFTFCC	International transport freight costs and other charges message	D	1
*	IFTIAG	Dangerous cargo list message	D	4
*	IFTMAN	Arrival notice message	D	5
*|	IFTMBC	Booking confirmation message	D	5
*	IFTMBF	Firm booking message	D	7
*	IFTMBP	Provisional booking message	D	5
*	IFTMCS	Instruction contract status message	D	7
*	IFTMIN	Instruction message	D	8
	IFTRIN	Forwarding and transport rate information message	D	3
*	IFTSAI	Forwarding and transport schedule and availability information message	D	4
*	IFTSTA	International multimodal status report message	D	7
	IFTSTQ	International multimodal status request message	D	3
+	INFENT	Enterprise accounting information message	D	1
	INSPRE	Insurance premium message	D	1
*	INVOIC	Invoice message	D	7
	INVRPT	Inventory report message	D	5
	ITRRPT	In transit report detail message	D	1
	JAPRES	Job application result message	D	1
	JINFDE	Job information demand message	D	1

	JOBAPP	Job application proposal message	D	1
	JOBCON	Job order confirmation message	D	1
	JOBMOD	Job order modification message	D	1
	JOBOFF	Job order message	D	1
+	LREACT	Life reinsurance activity message	D	1
	MEDPID	Person identification message	D	1
	MEDREQ	Medical service request message	D	1
	MEDRPT	Medical service report message	D	1
+	MEDRUC	Medical resource usage and cost message	D	1
	MEQPOS	Means of transport and equipment position message	D	1
	MOVINS	Stowage instruction message	D	3
	MSCONS	Metered services consumption report message	D	1
*	ORDCHG	Purchase order change request message	D	7
*	ORDERS	Purchase order message	D	8
*	ORDRSP	Purchase order response message	D	7
	OSTENQ	Order status enquiry message	D	1
|	OSTRPT	Order status report message	D	2
	PARTIN	Party information message	D	3
*|	PAXLST	Passenger list message	D	4
	PAYDUC	Payroll deductions advice message	D	1
	PAYEXT	Extended payment order message	D	2
	PAYMUL	Multiple payment order message	D	2
	PAYORD	Payment order message	D	2
	PRICAT	Price/sales catalogue message	D	5
+	PRIHIS	Pricing history message	D	1
	PRODAT	Product data message	D	2
|	PRODEX	Product exchange reconciliation message	D	2
	PROINQ	Product inquiry message	D	1
	PRPAID	Insurance premium payment message	D	1
	QALITY	Quality data message	D	3
*	QUOTES	Quote message	D	6
	RDRMES	Raw data reporting message	D	1
	REBORD	Reinsurance bordereau message	D	1
	RECADV	Receiving advice message	D	2
	RECALC	Reinsurance calculation message	D	1
	RECECO	Credit risk cover message	D	1
	RECLAM	Reinsurance claims message	D	1
*	REMADV	Remittance advice message	D	6
	REPREM	Reinsurance premium message	D	1
	REQDOC	Request for document message	D	3
*	REQOTE	Request for quote message	D	6
	RESETT	Reinsurance settlement message	D	1
	RESMSG	Reservation message	D	1
	RETACC	Reinsurance technical account message	D	1
+	RETANN	Announcement for returns message	D	1
+	RETINS	Instruction for returns message	D	1
	SAFHAZ	Safety and hazard data message	D	2
*|	SANCRT	International movement of goods governmental regulatory message	D	4
	SLSFCT	Sales forecast message	D	1
	SLSRPT	Sales data report message	D	3
	SSIMOD	Modification of identity details message	D	1
	SSRECH	Worker's insurance history message	D	1
	SSREGW	Notification of registration of a worker message	D	1
	STATAC	Statement of account message	D	2
	SUPCOT	Superannuation contributions advice message	D	1
	SUPMAN	Superannuation maintenance message	D	1
	SUPRES	Supplier response message	D	1
	TANSTA	Tank status report message	D	1
	VATDEC	Value added tax message	D	1
	VESDEP	Vessel departure message	D	2
	WASDIS	Waste disposal information message	D	1
	WKGRDC	Work grant decision message	D	1
	WKGRRE	Work grant request message	D	1

Appendix 6: National Contributions to Chapter 6/Section 6.3

6.3.1 Belgium

In Belgium the majority of maritime ports are defined as municipal ports, administrated by the municipality. The city is the owner of the port area, of the port infrastructure (quays, locks, and bridges) and of part of the port equipment (tugboats, floating cranes, sheds and warehouses).

The municipal authorities are the city council and the Board of Burgomaster and Aldermen having the legal authority and the political responsibility for whole the city, including the port. The management of the daily operations of the port is the responsibility of the administration, which applies the decisions taken by the authorities.

The port authority is responsible for the towage department. The stevedores are nor employed by the port, but they are a co-operative and the companies can ask the co-operative to assign the number of dockers they need. They are many other partners in the port, all of them are private companies, and they are linked to the port authority by a telematic system - for instance,. in the port of ANTWERP this is the SEAGHA system, and in the port of Zeebrugge it is the ZEDIS system.

Inland waterways
The Belgian inland waterways network is situated at the heart of the most dense navigable network in the world, constituted by 1560 km of canals, with capacities varying from 600 tonnes up to 9000 tonnes. More than 80 locks cope with the needed changes in heights to reach in different points of the network.

The Belgian inland waterways network is divided into three axial and two transverse routes as following:

The axial routes are:
- East: Antwerp - Liege (more than 9000 t)
- Centre: Antwerp - Brussels - Tournai (2000 t)
- West : Antwerp - Gant - Tournai (1350 t)

The transverse routes are:
- The South: Dunkerque - Liege (via Lille, Tournai, Mons, Charleroi and Namur (600 t)
- The North: Antwerp - Gand - Liege (more than 9000 t)

The Belgian waterways are connected to other countries network as follows:
1. To France by the Meuse river, Sambre, Escaut, the Lys and the canal Pommeroeul - Condé - Valenciennes;
2. To The Netherlands by the Meuse River, the Juliana canal, the Zuid-Willemvaart and the Escaut-Rhin canal;
3. To Germany, France, Switzerland (Basle) and Luxembourg by the Moselle river;
4. To the Central European countries (Austria, Hungary, Slovakia, Czech, Yugoslavia, Romania, Bulgaria) and Black Sea by the Rhine - Main - Danube - a mix of rivers and canals.

The majority of inland ports in Belgium are public enterprises. They enjoy the status of an autonomous port - so it is responsible for its own development, the maintenance of quays,

offices, roads inside the port and the dredging of the channels in the port area. The city is responsible for the infrastructure : that is roads, quays, electricity, water distribution.

The board of autonomous ports : half the board are nominated by the government and half by the city. The president of the board is the Burgomaster of the city and the director of the port plays the role of secretary of the board.

The resources of the autonomous ports: the autonomous ports receive certain amount of money from the city and the rest comes from quay fees, tolls, renting of lands, divers dues and subventions from the state.

The net profit of the autonomous ports are deployed as following:
- 20% maximum to supply a special funds reserve,
- 80% minimum to a fund to improve and to extend the port.

The regulatory aspects: navigation (rules, laws) including the transport of dangerous goods
In Belgium the inland navigation is organised by l'ORNI: *l'Office Regulateur de la Navigation Interieure.* It is a public foundation reporting to the Federal Administration of Transport. Its main task is to organise the transport of freight by the inland ships on basis of equal freight distribution over the available ships. ORNI deals also with the freight to France, but the transport of freight to Holland and the River Rhine are not part of ORNI. There is a coopertative agreement with the Dutch organisation in charge of the Dutch equal freight distribution system.

There are 8 freight offices of ORNI in Belgium. Foreign ships are not allowed to participate in the equal distribution and ships wishing to navigate the Rhine need to have the Rhine Patent. The Commission is located in Antwerp. The same commission delivers the certificate ADNR which gives the right to transport dangerous goods. Such transport is strictly governed by the ADNR regulations.

Future trends
Political decisions under consideration for the regulation of waterborne transport and the development of a telematic system. Several studies have been commissioned but it is understood that any approved system must be integrated in a Global European Telematic system.

6.3.2 Bulgaria

Bulgaria operates two maritime merchant ports - Port of Varna and Port of Bourgas and two river ports - Port of Rousse and Port of Lom, of national as well as international significance. Except Port of Lom, all of them have similar control and administrative structure, status and functions.

At the moment, the ports are entered on the trade organisation's register as state owned Public Limited Companies. The ports are managed by a Board of Directors, composed of 5 persons nominated by the Principal - the Minister of Transport. The Board of Directors elects one of its members for a Executive Director.

The port infra- and superstructure is public property and is managed and controlled by the port administration.

The port activities are implemented by port workers - full time employees.

As a rule, the repair and maintenance of hoisting and hauling devices and equipment is effected by specialised workshops belonging to the ports, served also by workers full time employees of the port.

In other words, the Bulgarian ports are still run in the old-fashioned model used in the times of the administrative planning command system. Simultaneously with the functioning of the existing management model, active moves are undertaken for introduction of a new port management model adequate with the contemporary conditions of market economy.

Within the frames of the Program for Bulgarian Transport Legislation Harmonisation, a new Law of Port, as well as corresponding regulations are under development. A working group has been assigned to elaborate the National port policy. At present, no matter that there is no Law of Port in force yet, there exists a Law for Concessions and Regulation for its enforcement, according to which concessions can be granted for operating port facilities.

In this transition stage, the Port of Varna, not awaiting the new Law of Port, has elaborated a Strategic Development Program, which suggests a model for transition to the market principles. It aims at establishment of an Europe-predominant port management model by:

- **Establishment of a Port management office** situated at Varna-East, with following main functions:
  - to represent the State and to act as a owner on behalf of it;
  - to elaborate the policy for general port development;
  - to ensure conditions for effective implementation of port activities;
  - to control, co-ordinate and guarantee safe port operation as well as observing all relevant national and international requirements.

- **Giving priority to activities** which, under market conditions and requirements should meet client's demands.

Within the frames of actual Bulgarian legislation, the Port of Varna, with the permission of the Ministry of Transport, begins its structural reform by stages, to adapt most adequately to its **client's interests** as well as to expected **private investors**.

6.3.3 Denmark

Denmark has 4 principal types of ports: Municipal governed and self-owned ports (40), a Trust port of special character (1), State owned ports (8), private owned ports (20).

The municipal ports (e.g. Aarhus, Aalborg, Odense and Fredericia) were set up by an Act of Parliament, to be self-owned public bodies directly responsible to their City Council having a Harbour Board empowered with the immediate administration of the port.

The Port of Copenhagen is likewise set-up according to an Act of Parliament to be a self-owned public body governed by a board, the majority of which, is appointed by the Danish State.

The port of Esbjerg is State-owned, set up by an Act of Parliament. It is administered by a local board responsible to the Minister of Traffic.

Statistics: Traffic in 1996 (1000 ton)

General cargo	13.723
General cargo (1993)	36.457
Liquid bulk	32.164
Dry bulk	50.368
Total	96.255

Internal organisation

Most of the municipal ports are fairly small undertakings and have simple and comparable management structures, usually sharing key management ports with municipality. The ports of Copenhagen, Aarhus, Aalborg, Odense and Fredericia have, however, independent port administrations.

Each port has a Chairman and a Board. The Chairman is usually part-time and is frequently the Mayor of the local town or is otherwise elected from among the members of the City Council. In Esbjerg the General Manager is appointed as the chairman. The majority of the board members are nominated by or are from public bodies, generally the city, normally 5-7 in total. In Copenhagen there are 12 members on the Board: of these the State appoints 6, including the Chairman and 3 board Members represent the private sector. The term of office is 4 years in all ports.

Each port has a chief executive officer whose title is normally General Manager or harbour Director. In municipal ports the General Manager or the Harbour Director is appointed by the City Council on the recommendation of the Harbour Board. In Copenhagen the General Manager is appointed by the board. In Esbjerg, the General Manager is appointed by the Minister of Traffic. The General Manager usually attends the boards meetings, but is not a member of the Board.

The special duties of the Chairman, if any, are laid down by the enabling statutes. The chief executive officer, who is always a full-time employee either of the Harbour Board or of the municipality, is in charge of running the port authority in accordance with current legislation and the provisions laid down by the Board.

The Boards of larger municipal ports often establish an advisory port committee representing port interest groups.

External relations

Each of the Danish Port Authorities has a statutory relationship with the Minister of Traffic. Only investment in Danish Traffic ports outside the breakwaters are subject to supervision from the Ministry thus the Danish Harbours are free to fix their own harbour charges under the control of the Minister of Traffic with regard to undue competition. Danish municipal ports are voluntary members of a non-statutory association (The Association of Danish Ports).

Charges, dues and revenues
Ports, dues, and charges are usually collected by the Port Authorities. Private operators collect their own dues. There are no charges for lights. The following charges are made in Danish ports. Ship dues; normally fixed in relation to the Gross Tonnage, GT, cargo dues; normally fixed per ton on goods or containers classified in 8-10 groups.

The main sources of revenues are: revenues from the above-mentioned charges, revenues from letting out uncovered areas and warehouses etc., revenues from letting out cranes and other mechanical equipment, income from interest.

Division of responsibility and powers

Maritime access
Decisions are made and investments paid for by the Port Authority, and the private sector may decide to pay for investments in certain specialised terminals. The facilities are operated and maintained by the Port Authority.

The Port itself
Most decisions concerning harbour infrastructure investment are made by the Port Authority, although exterior breakwaters are subject to the approval of the Minister of Traffic. They are usually paid for by the Port Authority, although some specialised terminals are the responsibility of the private sector. The facilities are operated and maintained by the body making the investment. Items of harbour superstructure are almost entirely the responsibility of the private sector, apart from fixed cranes. The operator fixes the tariffs and receives the revenues.

Most services for ships are provided by the private sector as are all services concerning goods. Security services are the responsibility of the public sector, sometimes assisted by the Port Authorities.

Transport Links
Decisions concerning railways are made jointly by the Port Authority and the State Railway. Most roads and related works are the responsibility of the Port Authority. But responsibility for ferries varies from port to port. Pipelines are mainly private. The operation and maintenance of the facilities are usually carried out by the bodies making the investment decision. For a great part of the basic communications, no charge is made, although the State Railways usually impose rail haulage charges. Where relevant, all money are paid to the operator.

6.3.4 Finland

In Finland, ports operate mainly as public offices. Major ports are owned by municipalities although they may delegate the task of organisation and running the stevedoring activities to theport operators/stevedoring companies. However, privatisation of some ports is now in process. The ports operate fairly independently and they are also specialised. The ports usually have their own information technology applications and development projects. Since the traffic volumes and the data flows are small, the information systems are mostly rather small.

In addition to the port authorities, there are many other parties operating in the ports. With respect to data processing the most important are the port operators/stevedoring companies, since they manage all the operations with cargoes.

6.3.5 France

France is bordered by four seas - North Sea, the Channel, Atlantic Ocean and Mediterranean - and has 5,500 km of coastline. It has a merchant fleet which carries some 297 million tons of goods each year, which places France fourth in Europe and eighth in the world: French ports handle 24% of Europe's sea ports global merchandise imports and exports.

There are 6 Autonomous ports (Bordeaux, Dunkirk, Le Havre, Marseilles, Nantes/St-Nazaire, Rouen) and 17 non-autonomous ports called 'trade ports of national interest'. Marseilles, Le Havre and Dunkirk rank respectively third, fifth and seventh in Europe, and Nantes/Saint-Nazaire and Rouen are also very active. Marseilles is the largest French port in volume terms (92 million tons and 550000 TEUs) and, Le Havre is the largest port for container traffic (1 million TEUs).

The turnover of maritime firms is 25.8 million French Francs (4.3 MECU)

The Boards of Autonomous ports are nominated partly by local authorities, by Chambers of Commerce and by election within the port's staff. The Boards elect their Chairman. The Port Director - for both autonomous and non-autonomous ports - is appointed by the Council of Ministers, they are civil servants.

The port infrastructures in **autonomous ports** are created jointly by the port authority itself and the State. The State generally provides 80% of the operating cost, and finances 100% of the maintenance. For specialised terminals, the industries concerned participate in the cost. The superstructure and equipment are entirely financed and operated by the port authorities, and most often let to handling companies or shipping companies. Specialised equipment is usually financed and operated by private enterprises.

In the **non Autonomous ports**, the state finances 30-50% of investment costs and the chamber of commerce finances the rest. Almost, 100% of maintenance cost of the ports is provided by the state. The decisions concerning the infrastructure are made by the State after consultation with the port council. In the case of specialised terminals, the cost of infrastructure can be met by a private firm. Superstructure and port equipment are financed and operated by the Chambers of Commerce, except in the few cases where they are under the responsibility of private companies

In France, all port dues are collected by the Customs Authorities. Thus, a real trade link exists between port authorities and local customs authorities.

The dockers are not employed by the port authority nor by the chamber of commerce. Modification in the law (in 1992) modified their work - now the dockers must be permanent employees of handling companies with monthly wages, which are freely negotiated and are independent of location.

The forwarders are private companies in charge of the goods, they generate the Bill of Lading, and they are the links between the shippers and the shipping agent/shipping lines.

Most of the forwarders in the port communities are also Customs agents. The existing port community systems were, at the beginning, created, financed and operated by the port forwarder associations, with the partnership of the Customs.

In France, the Customs brokers are public offices, they have the responsibility to prepare for the French Customs the declaration from a foreign manifest.

Inland waterways
With 5.7 million ton/kilometres, inland navigation carries less than 4% of French domestic freight. This situation reflects three factors: the decline of the coal and steel industries, competition from the railroads, and above all the obsolescence of the system. With a network of 8500 kilometres - 1686 km for 3000T and larger vessels, 248 km for 1500 to 3000T, and 4288 km for canal vessels - France has the longest system of navigable waterways in Europe, but many of its canals are too small to permit large vessels to navigate between the major axes - such as the Seine, the Rhône, the Moselle and the Rhine. In all, only 1,860 kilometres meet the European standard of 1500 tons.

Projects to breathe new life into this form of transport are under consideration. In addition to a Rhine-Rhône link for large vessels now in the planning stage, the State is considering the construction of a second link between the Seine and the canals of the north.

Future trends
After essential restructuring, the largest French ports for may now receive the Post Panamax container ships (more than 5000 containers/ship). Many projects are underway for improving the distribution management of cargo from/to the hinterland through more efficient railways, highway and inland waterway access, partly to compete with the Northern ports as well as the Mediterranean ports. In some of these projects, French ports communities participate in co-operation with other French port communities in such way to ameliorate intermodal supply and distribution chain management - Marseilles and Le Havre, Bayonne and Bordeaux, etc. In all these projects, Information Systems and Telecommunication are seen as a necessary and competitive advantage.

6.3.6 Germany

General aspects
We are facing the task of organising the mobility of more and more persons and goods in a safe, intelligent, and environment-friendly way. This can only be achieved through an expanded use of communication, guidance and information technologies – in brief, telematics – in transport and traffic management.

The applications of modern telematics in transport and traffic that the Federal Government has been supporting and continues to support include the employment of these technologies for

- a better use of infrastructure capacities and an improvement in the traffic flow;
- the interconnection and interlinking of the various modes of transport with the overall aim of transferring traffic volumes to environment-friendly means of transport (from road to rail and from road to sea). As far as maritime transport is concerned, the aim is to absorb as much as possible of the heavy load of traffic now being borne by roads, with the emphasis on the above-average environmental friendliness of water-borne carriers (sea-going ships, inland vessels, barges, etc.);

- the creation of market instruments for the development of infrastructure;
- a reduction in traffic movements with the aim of relieving the environment;
- an improvement in traffic safety.

To achieve the best possible interconnection among the various modes of transport while, at the same time, making full use of the existing infrastructure and taking into account environmental aspects, an integrated traffic management system across all carriers will be required. It must provide the largest possible degree of compatibility and inter-operability of systems throughout Europe.

The design and organisation of interfaces in the intermodal transport of goods is of major importance in forming a continuous transport chain. This is all the more true for sea ports. Another crucial point are the privately-financed creation of logistic systems being developed all over Europe that must co-operate with German telematic services. These complex systems will be used to gather and collate current traffic, transport and environmental data for all modes of transport in the most comprehensive way possible, to arrange them in common databases, and to relate carrier-specific control systems one with another.

Conventional information and communication systems that had earlier been used for the purposes of just one port or of just a few users have, in the recent past, transformed into more and more complex information systems for the benefit of all those involved in the transport chain. The services of these systems, linking the various partners in transportation as well as the involved authorities, range from the exchange of dangerous goods notification messages to the establishment and operation of dangerous goods databases to fleet management to the operation of VTS systems, including the interfaces with hinterland transport operators (rail, road, inland waterways). All in all, such sophisticated and highly efficient information and communication systems make a substantial and even an essential contribution to the efficiency of their respective port and are now a major factor in port competitiveness.

The Federal Government has supported for several years a number of research projects with the ultimate aims of enhancing the competitive edge of German sea ports and to allow a further development of modern technologies to be used in their operation. Since the mid-eighties, more emphasis has been directed towards port telematics. One outstanding example is the nation-wide project known by the name of ISETEC, which is the acronym for "Innovative Seaport Technologies".

The organisation and operation of telematic systems (to be precise: to the extent that they do not fall within the immediate responsibility of the State) must be a private venture. In this country, the State's responsibility is restricted to accompanying, with benevolent neutrality, the process of introducing such applications and to creating the technical, organisational, and legal framework conditions, where necessary. This is yet another domain where "public-private partnership" is the word of the day.

The Federal Government and the Sea Ports

The Federal Government has the primary responsibility for the co-ordination of those aspects of port operations that are related to transport policy. Two major aspects here are the preservation of the efficiency of German sea ports in their competition with foreign ports, and to represent them abroad. Within international institutions, the Federal Government is the official carrier of German port-related policy, doing so in conjunction and consensus with the German Coastal Länder. Under the terms of the Maritime Navigation (Federal Competencies)

Act ("Seeaufgabengesetz"), the Federation has a corollary obligation, beside that of the Coastal Länder, for ensuring the efficiency of the country's sea ports.

The organisational structure of the ports
The organisational structures of sea ports are quite different in the various Coastal Länder of the Federal Republic of Germany, viz, Mecklenburg-Western Pomerania, Lower Saxony, Schleswig-Holstein, Hamburg, and Bremen.

There is no such thing as a Port Authority exercising all public port-related functions. These are distributed among various departments of Land authorities, who perform such functions as part of the general administration of the Land concerned.

Most of the maritime ports in Germany are publicly owned and operated. To give one example, there are forty-one public sea ports in the Land of Niedersachsen (Lower Saxony). Port-side cargo-handling enterprises, too, are mostly owned by a public entity, often the local municipality. However, there is a tendency towards more and more private interests engaging themselves in cargo handling and other port-related services. The number of privatised cargo-handling enterprises that were formerly in public ownership continues to grow.

Infrastructure and suprastructure
Under the terms of the Maritime Navigation (Federal Competencies) Act ("Seeaufgabengesetz") of 1965, the Federation has a corollary obligation, beside that of the Coastal Länder, of ensuring the efficiency of the country's sea ports. As a result, the Federation has assumed the responsibility for a number of infrastructure measures, namely:

- the construction and maintenance of transport routes (access routes and hinterland connections by road, rail, and inland waterways); for details, refer to the Federal Traffic Infrastructure Plan ("Bundesverkehrswegeplan") 1992;
- the provision, respectively, the construction and maintenance of traffic-related services systems on and along the Federal waterways (aids to navigation, VTS systems, pilot services).

The Federation also exercises its influence on the efficiency and competitiveness of the sea ports in that it has the obvious responsibility for measures of an *ordre public* character (such as road pricing) and through its co-operation, in the framework of the European Union, in matters relating to ports.
The Coastal Länder and/or the municipalities, in their capacity as landowners, have the competence for the construction of infrastructure elements considered to be "in the public interest" (such as harbour basins, quays, port railways, roads, water and energy supply lines on the shore-side), on the one hand, and for measures of an *ordre public* character (such as port dues) on the other.

By contrast, the construction and maintenance of suprastructure, i.e., the building, purchase, and/or maintenance of cargo-handling equipment and facilities (such as quayside sheds, warehouses, cranes, ground transport equipment, etc.) are the sole responsibility of the port operator in question.

Inland ports
Basically, the Federal Government has no competence in matters of inland ports. These are rather the responsibility of the Länder and/or of the local municipalities. However, the Federal

Ministry of Transport is involved in the development of logistics concepts. There is reason to expect that the concepts for the development of sea ports that the Federal Government supports will also be implemented in inland ports.

6.3.7 Greece

Fifteen main ports handle 59% of the total Greek Seaborne trade. The organisation, administration and operation of legal entities (NPDD) exercise delegated State authority. There are two types of legal entity - "Port Organisations" (Piraeus, Thessaloniki) and "Port Funds" (58 in all, of which 23 operate at a prefecture level). The two types of legal entity have different degrees of autonomy but their overall supervision and administrative control is the responsibility of the Ministry of Merchant Marine. These are basically Public ports and Private ports having dedicated port facilities serving specific industrial activities.

Port Organisations are administered by a Board of Directors and are managed by a General Manager. With regard to the Port Funds, a body called the Port Committee exercises both administrative and managerial power. The decisions of the Boards of Directors and the Port Committees are submitted for approval to the Ministry of the Merchant Marine and the Prefecture, depending on the situation.

The Port Organisations and the Port Funds have direct relationships with most of the Ministries, regarding port planning and development. The Port Funds also have direct contact with the local prefecture authorities who exercise administrative control over their activities (approval of annual income and expenditure budgets, etc.).

The income of Greek ports come either from various dues and fees imposed on ships, vehicles carried on them and passengers, or from concession fees for land use within the port area, rent of warehouses, use of cargo handling equipment, charges on imported goods and oil, having their origin in non EU countries. In addition to the above revenues, which are collected, mainly, by the Port Funds the Ministry of Merchant Marine allocates to the Port Funds income from a uniform tax on tobacco, taxes on petroleum products imported from non EU countries and processed by domestic refineries for internal consumption, and tax on imported goods of non EU countries. Moreover lighter dues and pilotage dues are paid over to the state and individuals. Cargo handling rates are paid over to the dockers concerned and are collected by the port organisations.

In Greece work and the construction of access channels to serve ships is financed by the State. The Ministry of Public Works has responsibility. Investment in construction of breakwaters, jetties and wharves is carried out by State (except for the ports of Piraeus and Thessaloniki). The construction of sheds and warehouses is financed from the public investment program (except for the ports of Piraeus and Thessaloniki) in effect from Prefecture Funds and Port Treasuries. Cranes and other such cargo-handling equipment are mainly provided by the state under the public investment program.

Dockers at Greek ports other than Piraeus and Thessaloniki are divided into permanent and relief workers. Port dock work has two aspects, labour and invoicing. Both of these are governed by committees set up in each port where there is a Port Treasury, known as Committees for the Regulation of Cargo-Handling at Ports. The Ministry of Labour has responsibility for the training of dock workers and practical training on the latest machinery and the ports mechanical and electrical equipment.

During the last months there has been established an institutional restructuring in the PPA (Piraeus Port Authority). Over the years, the management and institutional model of the PPA has served the port well, never requiring the State to support it financially, and allowing the port to finance its own development. However, it became obvious that change was long overdue. As competition in the port sector has become stiffer, it became clear that the current model is not very well geared for flexibility and aggressive marketing. To rectify this situation, the PPA is in the process of becoming a Corporation, owned by the State. For this purpose, a study has been awarded to the University of Piraeus in order to recommend the new organisational framework. The study is expected to be finalised in February 1998.

6.3.8 Hungary

Water transport related issues of the Transport Policy in Hungary

Their waterways have been upgraded to a transcontinental state line following the opening of the Danube-Maine-Rhine Canal, but it has on the Austria to Budapest section a serious obstacle in the form of insufficient navigation depth (especially in summer months). Along the major rivers, there are no modern freight ports fulfilling the EU standards. Thus, the progressive and continuous development of the waterway on the Danube should be strategic national target. In the long term, the construction of the Danube-Tisza Canal will open up access regions beyond Tisza by inland waterways. The agricultural considerations of such a development are also important.

The most important targets for the development of the water transport are:

- deepening of the section Austria-Budapest of the Danube waterway in conformity with ecological viewpoints to the shipping class VI/b of the European standard (by a draught standard of 2.5 m);
- development of the ports of national interest (Gyor-Gonyo, Budapest-Csepel, Dunaujvaros, Baja, Nagyteteny), building ports necessary to allow combined transport, and the construction of suitable road and railway links to the ports;
- it is necessary to deepen the river Danube (as above) to allow price efficient sea-river navigation to be developed to give direct access, without any transbording to the Mediterranean basin, as well as to the Ukrainian and Russian inland waterways;
- to update the inland navigation fleet because of the transfer of its emphasis from south-east to north-west routes, but the poor condition of the existing fleet suggests 50% should be scrapped. The general situation makes such a one-time technologic change seem reasonable. But it cannot be achieved without State support and must considering within the policy related to the ship repair industry.

Ports

Current situation

There are a lack of links between the Danube and the larger cities which are potential sources and destinations of goods which might be shipped by water transport. The lack of port capacities is disadvantageous for carriers and customers as well, and this fact decreases the overall economy and competitiveness of this transport mode. The density of inner waterway networks in Hungary is very low compared to the EU average as is the network-density of other land transport modes (25%).

It is not possible to finance the implementation of the infrastructure of the missing public ports purely by private sources. After a long lack of public investments in this sector, transforming to a full market-orientation as a step-change is not a realistic goal.

Strategy of port developments
Development is planned in three different groups of ports:

- public ports of national importance : 6 ports are in this category: Gyor-Gonyu, Budapest Csepel, Nagyteteny, Dunaujvaros, Baja Szeged. The majority of the ownership has to be held by State owned or concession companies with regard to the financing of the infrastructure development and the operation
- regional ports with market potential financed and owned by private sector
- ports of local interest financed by the private sector

The State has the responsibility only for the development of the first group. State's responsibility is required only to provide the level of technical standards in the second and third groups of ports.

The Government's resolution of December 1996 was to create the Gyor-Gonyu port based on competitive bidding. In the February of 1998 a Call for Tender will be issued. In the next 10 years, according to expectations, about 10 billion HUF (1 DM = 114 HUF) (44 MECU) will be invested in the development of this port, and the State's contribution of 2-3 billion HUF (11 MECU) will provide the necessary infrastructure outside the port. The preparation work has been already begun by the end of 1997, taking up 531 million HUF (2.3 MECU).

At the public port of Baja the construction of a roro combined terminal has been started with 230 million HUF (1 MECU) as a start-up budget. Additional sources from the Environmental Fund amounting to 114 million HUF (0.5 MECU) have been also used here.

The Government resolved to create a public port in Csepel and the realisation is in process. Further, preparations are in place for the development of a roro and container port in Nagyteteny, but the lack of financial sources makes the progress slow.
For the same reasons (lack of investment funds) the port developments at Dunaujvaros and Szeged are limited to their design phase.

The underdeveloped network of the Hungarian public ports would require an investment of some 3 billion HUF (13.2 MECU) per year over the next one and half decades, but only a small fraction is estimated to be available.

6.3.9 Ireland

Ireland is an island off an island off Europe. It is unique in Europe as it does not have a physical land connection, or a fixed link such as a bridge or tunnel, to continental Europe. The Republic of Ireland has 3.75m population, has a rapidly developing economy and is heavily dependent on international trade. GNP has been growing at rates of 6-9% for several years. Ireland has become attractive for foreign investment especially in the High Tech manufacturing sector. Much of this is based on global sourcing of inbound components for manufacturing on the JIT (Just-In-Time) principle and direct distribution of finished product to the European customer, avoiding warehousing where possible. This places much emphasis on excellent logistics management and international air and sea transport services. Good information flows are critical to support the necessary visibility on the supply-chain. Shipping

in particular is of utmost importance both for RoRo (Roll/on, Roll/off) trucking services, and short and deep-sea LoLo (Lift/On, Lift/Off) container services. Efficient port operations therefore are vital part of the national infrastructure to facilitate international trade.

Over recent years there has been substantial investment, supported by EU Structural and Regional funding in the physical infrastructure in the main Irish ports including road access, ramps, terminals, quayside developments etc. This in turn has led to the introduction of many new shipping services, particularly short-sea ferries to support RORO and container operations. There has been significant increases in port throughputs in recent years. While all ports have shown increases, this is most apparent for the two largest general cargo ports, Dublin and Cork. It is now appropriate to maximise the physical investment made nationally by adding electronic information links to improve the information exchange and reduce paper handling systems, for firstly, the efficiency of the ports themselves, and secondly, to provide the logistics support needed by Irish industry. This has not in the past been as good for sea borne traffic as it has for other modes of transport.

Ireland is so dependant on maritime transport, that it cannot have anything but the best facilities and services to maintain and develop the world class manufacturing and logistics support standards needed. The key role of logistics is also recognised by the Irish Government and State Development Agencies, and it is expected that they will be providing the policy and incentives to ensure the Irish ports play their part in this most important area of strategic industrial development and national economic policy

6.3.10 Italy

In Mediterranean harbours, the traffic over short distances is increasing 1) as a substitute for land transport, and 2) as transhipment, or feeder traffic, connecting to oceanic connections. The major and minor ports are obliged to improve their organisation, of which the telematics systems are essential parts.

The overall port network system in Italy is fully in line with the above statements and is characterised by:

- a very high number of medium or small size ports: 132 as classified by the national Institute of Statistics (ISTAT),
- a limited number of major ports: only 6 carry 50% of the total international traffic and 9 carry 50% of the total national traffic. A few - Genoa, Livorno, La Spezia, Trieste, Venice - have implemented a real Port Community System.
- there is a very limited diffusion of Telematics in small-medium size ports; in practice, none of them has implemented a Port Community Systems.
- there is a very dynamic situation of transformation from the former Public management structure to a new Private Management structure, where stevedores have lost their old monopoly power as unique workers on the berths. Ports are supervised by the Port Authority, having overall responsibility for general development policy, for safety and for major infrastructure works, but private Operators are fully assigned to transport operational activity.

The above mentioned evolution (maybe a "revolution"), which presently is still in progress in some ports, follows the national law (N° 84 of 28/01/94) that allows private operators to have direct and full management of Terminals (passengers and goods) using their own manpower and infrastructures.

Some significant results of these changes are:
- 80% increase in the overall container traffic between 1995 and 1997,
- 1 whole berth leased to a big Dutch operator in the port of Trieste,
- 5 berths leased to Greek ship owners in the port of Venice, and

6.3.11 Portugal

Structure

The present institutional set-up in the Portuguese port sector is laid down in specific law of 1986, known as the basic national ports system law. This law defines the fundamental principles governing the functioning of the national ports system, including the general bases of the port organisational and administration statutes, with a view to creating the conditions for standard business management practice at Portuguese ports.

Ports in Portugal are State-owned and the State alone is responsible for their operation, although in some cases operational services are provided by private companies on the basis of concession contracts.

Ports in the Autonomous Regions of the Azores and Madeira come under the jurisdiction of the respective regional governments.

Either port authorities or autonomous councils administer the ports.

The four main ports of Lisbon, Leixões, Sines and Setúbal come into the port authority category. The port authorities are public institutions possessing a legal identity and administrative financial and patrimonial autonomy, and are subject to government control through the Ministry for Social Equipment, Planning and Territory Administration. These ports are administered by government-appointed management boards and enjoy a high degree of independence.

Autonomous councils based on Government delegation give technical co-ordination to administer the remaining commercial ports. Again set up by the Directorate-General for Ports, Shipping and Maritime Transports they constitute regional bodies with legal responsibilities, but which are administratively and financially autonomous.

Although they are financially independent, nearly all their investments receive State Budget support.

Internal organisation

Port authorities

The statutes of each port authority define the organs and departments responsible for the management and administration of each port with regards to its constitution, jurisdiction and operation. Revenue from the exploitation of each port is intended to cover current operating cost and investment plans.

The port authority comprises the following: the Management Board, the Supervisory Committee and the Advisory Council .

The Management Board has a Chairman and four members, appointed by the Government for a renewable three-year term of office.

Autonomous Port Councils
The bodies administering and running the Autonomous Port Councils are: the Council, the Administrative Committee and the Port Director. Revenue from the commercial exploitation of ports is collected directly by the councils to cover exploitation cost.
These Councils are comprised of automatically entitled members (engineer-port director, harbour master, head of the customs delegation, representatives from the competent Ministry and regional bodies) and elected members (local interest groups: commercial, industrial, agricultural, fisheries and regional waterways transport, together with representatives of port users).
The Administrative Committee is composed of a Chairman and two members: the engineer-port director and the harbour master.

The engineer-port director has executive responsibility and is appointed by the competent Minister.

The Administrative Committee is responsible for supervising port administration, implementing all decisions of the Government and, in particular, ensuring that investment plans are drawn up and submitted to the Government for approval.

Port partners
The port operator (stevedore) undertakes the running of freight movement operations from the technical aspect and determines the human resources (team or gang) to be provided for the port operation.

Although in exceptional cases the port operation may be carried out by the port authority, private firms normally undertake it, which may be one of the following:
- stevedores operating under licence at public wharves
- port operation public services concession-holders, administering wharves or terminals under concession
- concession-holders administering private terminals for their own profit

The Harbour Masters police the jurisdictional areas of the ports, namely those related to the operation and safety of vessels, the port security, and the co-ordination of assistance to shipping accidents and maritime pollution;

Customs control and clear customs duties and taxing goods and people entering the country (community frontier) through the national ports;

The National Institute of Port Pilots assure through their local departments in each port supply the services for piloting the manoeuvres for the entry and departure of vessels;

The Companies Offering Towing Services, whether they be private or a service offered by the administration of the ports, provide for the towing of vessels on entry and departure;

The Shipping Agents, in each port, representing ship owners and the shippers;

Medical/Sanitary Services, who carry out the sanitary inspection of vessels and crew;

There are many other companies who operate in the Ports, for instance. Superintending companies who supply the expertise for the quantitative and qualitative inspection of cargo in the interest of the client and shipper; Ship chandlers supply provisions and supplies to vessels; Bunkerage companies who supply fuel to vessels; Ship repairers; vessel and equipment classifying companies; insurers; forwarders, customs brokers, transport services rendered between vessels and land.

Expected trends
A specific law adopted in 1986 regulates the organisation of the state port systems. New legislation is expected very soon concerning the maritime-port sector, having an institutional and organisational framework, under which:

- A Maritime-Port Institute shall be established for the control and co-ordination of the whole sector;
- The Port Authorities of Leixões, Aveiro, Lisbon, Setúbal and Sines shall become Public Undertakings, reinforced by an undertaking statute;
- The present Autonomous Port Councils shall get a Public Institute Statute and a wider autonomy of management.

6.3.12 Romania

Romanian ports were developed in correspondence with the maritime and river traffic flows. Management of river and maritime ports are organised as Port Administrations and the National Authority is the Ministry of Transport. There is the Danube and Inland Navigation Directorate (DDCN) and Ports and Maritime Directorate (DPNM) - the latter subordinates the Constanta Port Administration (APC) which co-ordinates the activity of maritime ports Constanta, Mangalia, Midia and Tomis.

D.D.C.N. subordinates 3 administrations:

- Maritime Danube Ports Administration (A.P.D.M.), with the headquarters in Galati, which co-ordinate the activity of maritime ports between Sulina and Harsova, as well as those on the Macin branch.
- River Danube Ports Administration (A.P.D.F.), with the headquarters in Giurgiu, which co-ordinate the activity of ports between Moldova Veche and Cernavoda.
- Inland Navigation Administration (A.C.N.), with the headquarters in Constanta, co-ordinates the activity of Danube – Black Sea Canal, Poarta Alba – Midia – Navodari Canal, ports Medgidia, Basarabi, Luminita and Ovidiu, as well as of Cernavoda and Agigea locks.

The ports development is the responsibility of the Authority and is based on policies and development programs for the national ports system, the policy for each unit being set in the Port Development Plan. The Authority is enabled to approve constructions and use of the land next to port territories described by law, upon the proposal of the Authority.

The new ports regulation fills the existing legislative gap under the transition from a centralised economy to a market economy, with the respect of the provisions of the Romanian Constitution, as well as with the requirements of harmonisation with the relevant European legislation.

The main objectives of Romanian port development strategy are:

- the transformation of Ports Administrations into Joint Stock Companies.

- the privatisation of port operators
- the participation of the private sector to maximise the mobilisation of resources in order that ports become more competitive.
- to allow access of private operators in public harbours by concession and leasing.
- to attract foreign investments for rehabilitation, modernisation and improvement of port capacities and facilities (through tax exemptions and exemptions from the payment of royalties, as well as the Government guarantee for foreign loans).
- to develop Constanta Port, as a terminator of the IVth and VIIth European Corridors, and as a major centre for cargo storage and distribution in the Black Sea area.
- to develop the free trade areas in Romanian ports.

The information systems of ports administrations cover:
- management system
- commercial and financial systems
- access in ports
- patrimony management
- investments resources
- documentary and internal parcel delivery administration.

The information systems for ports will contain informational system of port management and links with port operators, customs, Railways National Administration (SNCFR), Danube – Black Sea Canal Administration, Road Administration.

In the area of navigation safety, the Ministry of National Defence, Ministry of Internal Affairs and Ministry of Transport collaborate on an integrated system for pursuit, surveying and control of ship traffic in the Black Sea. The system will allow the simultaneous and independent use of its data. The further development and integration with other related or similar systems is taking place, as well as the connection to the system of other legally enabled users.

The main functions of the system are
- taking information from radar stations and other detectors.
- data processing regarding the position and movement of ships and of floating navigation signals.
- display system information on the operating terminals.
- the continuous and real time surveying of all ships and marker positions which are in the controlled area
- the permanent and mutual exchange of information regarding navigation and the manoeuvre between the control centre and ships
- warning and alarming of operators regarding navigation dangers, or system degradation.
- recording and supporting computer assisted administration of the system information.

6.3.13 Slovakia

There is a process of transformation in Slovakia commencing 1st January 1997 in which the former "Slovenska plavba dunajska s.p." being 100% State owned, is changed to the "Slovenska plavba a pristavy a.s." (SpaP a.s.). Along the river Danube in Slovakia there are two main ports Bratislava and Komarno which are at this time part of the state owned company SPaP a.s. The ports are managed by The General Directorate of the (SpaP a.s.). The General director is appointed by The Ministry of Transport, Post and Telecommunication of

the Slovak republic. The only privately owned port is "Juhoslovenske celulozky a papierne" in Sturovo is not of great importance.

It would be useful to describe structure of SpaP a.s. as it is divided in the following divisions.

Division of River Navigation
The Division of River Navigation provides transport along the whole Rhine-Mohan-Danube waterway and also links to the whole European inland water system. The structure of the fleet allows transportation of all kinds of cargo including big and heavy pieces, containers and trucks aboard special roro barges. The overall capacity of the fleet for general, bulk and liquid cargo is more than 300000 tons, with overall output power of engines 50000 kW (for push technology of river navigation). The fleet consists of 270 different ships – 40 pushers, 9 so-called Danube ships (DNL), 177 push barges for dry cargo, 19 barges for liquid cargo, 11 pull barges, 4 barges of roro type, and 10 harbour tugs. The River Transport Division offers port services in the ports of Bratislava and Komarno.

Division of Sea Navigation
Deep sea transport rests outside Slovakia (as Slovak republic is landlocked country) - as a consequence deep sea navigation has no influence on Slovak ports or navigation. There are three vessels:

- m/s Ailina, 7939 DWT, built in 1988 in China
- m/s Otava, 7947 DWT, built in 1988 in China
- m/s Banská Bystrica, 3613 DWT, built in 1988 in Poland

The division provides transport all over the world. The division has own communication system based on Inmarsat A and Inmarsat C.

Division of Port of Bratislava
The port of Bratislava is situated in the capital of Slovakia and provides the usual port services. At present the port area covers 205 hectares, including 48 hectares of water: an additional 30 hectares are allocated for further development. The port of Bratislava has excellent railway and road connections and its geographical position is extraordinary advantageous: it is located practically in the middle of the Trans-European route from the Black Sea to the North Sea, very close to Vienna and Budapest, with road and rail connections to Slovak and Czech industrial centres.

The port of Bratislava handles 2 million tons of various goods yearly. The maxium capacity is 3 to 3,5 million tons depending of the type. There is a roro facility (1996 –10000 cars, 1997-20000 cars and up to 40000 VW cars are to be transhipped in 1998). Two portal cranes have a lifting capacity for overweight pieces up to 560 tons and there are also 22 gantry cranes for cargo handling having a lifting capacity from 3,2 up to 35 tones. There is liquid cargo and cement reloading facilities and public custom warehouses of 4 600 sq. metres of sheltered storing area allows handling cargo independent of weather conditions and offers complete custom's declaration facilities.

Division of Port of Komarno.
The Port of Komarno is situated 100 kilometres downstream from Bratislava. It is a typical port destined for transhipment and handling of bulk and general cargoes. The port has been very well equipped with gantry cranes allowing for the handling of cargoes up to 32 tons, and with mobile cranes up to 50 tons. The port has sheltered warehouses up to 7000 m^2 and open storing areas of 20570m^2. It has good road and railway connections. When we compare the

two ports (Bratislava and Komarno) we find Komarno is not equipped to handling liquid cargo, but can handle very well general cargo and containers. In the future, after completing the Vah waterway the port of Komarno will be very important for handling cargoes arriving from the Danube and going further on the Vah waterway to destinations in Central and North Slovakia. The first 50 kilometres of Vah waterway is due to be open in 1998.

Division of Passenger Transport
This Division operates 10 passenger vessels providing passenger transport mainly to and from Hungarian and Austrian ports by means of hydrofoils of the Voschod and Meteor type.

Slovak Shipyard a.s.
The shipyard was established 25 years ago to provide repairs.

Future trends
After completing the transformation process, the ports will be privatised and it is expected that their operation will be more flexible and that there will be more place for the development of small and medium sized companies in both ports. In the past there were problems with the water level in both Slovak ports during some parts of the year. The conditions improved rapidly after completing the Slovak part of the Gabcikovo-Nagymaros system so now the port of Bratislava has good conditions for loading during the whole year. There is a chance for the same improvement in Komarno after solving the problem of the Nagymaros dam on the Hungarian side.

In the future the port of Bratislava will be developed to a real multimodal point for all kinds of transport. In fact as it is the port has good infrastructure for rail, road, roro and heavy cargo loading. Large investment is expected to communication infrastructure in both ports. SPaP a.s. is ready to use EDIFACT in all of its divisions (including ports), but at this moment there is no use of it. There are also VAN operators in Slovakia for EDI and EDIFACT and SPaP a.s. has a preliminary agreement with one of these operators. However, everything depends on outside needs for such kind of communication.

6.3.14 Slovenia

In the Republic of Slovenia the port related policy and maritime transport in general is under the responsibility of the Ministry of Transport and Communications. It has a special division for this purpose, called The Slovenian Maritime Directorate. This directorate is managing the ports infrastructure, the safety of water transport. The intention behind the establishment of this Directorate was to give greater emphasis to the importance of maritime affairs and the maritime orientation of the Republic of Slovenia, which is a consequence of the Slovene Maritime Resolution of 1991.
The owner of the sea, sea-shore and corresponding land is the Republic of Slovenia.

Facts about ports and policy
In Slovenia there is only one maritime cargo port, which is becoming increasingly important and is attempting to become the best port in southern Europe during the next decade. This is the Port of Koper (which has ISO 9002 for its complete port services). It is a public limited company with 51% being owned by Slovenian government.

The port of Koper performs most of its services for hinterland countries such as Austria, Hungary, the Czech Republic, Slovakia, Poland, southern Germany, Italy, Switzerland,

Croatia, Bosnia and Herzegovina, FR Yugoslavia and also for FRY Macedonia, Albania, Bulgaria, Ukraine and Russia. This is logical, as Slovenia and represents the shortest link between Central Europe and overseas - in 1997 the port of Koper reached a turnover of 7,27 M. tons of cargo.

Port of Koper has eleven specialised and highly efficient terminals for handling various types of goods such as general cargo, fruits, vegetables and frozen goods, livestock, containers, cars & roro, timber, dry bulks, ores & coal, liquid cargo, alumna, cereals. The entire area of the Port of Koper extends over 1600 hectares and the total area has the status of a Duty Free Zone. It is also used for various port services, warehousing and distribution, processing, finishing of goods, industrial and various other added-value activities.
The port of Koper has significant influence on national transport policy, especially with regards to railway transport. About 80% of land transports from/to Port of Koper is via railways, which are a state owned enterprise. Current railway connections are to be upgraded in mid-1998 to enable about 30% higher traffic to/from inner Slovenia.

Future work
In March 1998 the Slovene parliament discussed a new proposal for the maritime statute book and law of inland waterways traffic. Slovenia is also about to ratify approximately ten international sea and maritime conventions and acts. Besides these, EU related activities are to be addressed – but currently only a general framework is given within Resolution of Transport of Republic of Slovenia. This is in a draft phase.

6.3.15 Spain

In Spain there are some 245 ports, 41 of which are State-run and the remaining 204 run by Regional Governments. The State-run ports are grouped under 26 Port Authorities.

Commercial ports are, in general, State owned. Their size is small or medium when compared to major European ports, their hinterlands are relatively small and, with few exceptions, included within Spanish territory. Owing to their excellent geographical position and the lack of restrictions regarding infrastructure and exploitation, some Spanish ports, especially those in the Mediterranean, provide suitable conditions to enable them to become hub-ports.

State-run ports: Traffic in 1997

Dry bulk	71.533	thousands of tons
Liquid bulk	126.007	"
General cargo	82.255	"
TOTAL	279.795	thousands of tons
Containers	5.027	thousands of TEUs

The State port system

The Ministry of Fomento.
The Spanish Ministry of Fomento is responsible for establishing the guidelines for port policy, in keeping with the general policy on transportation.

Ente Público Puertos del Estado.
Execution of the Government's port policy and co-ordination and control of the State port system falls upon Puertos del Estado.

Puertos del Estado is an entity of Public Law ascribed to the Ministry of Fomento, with the following functions, among others:

Puertos del Estado is an entity of Public Law ascribed to the Ministry of Fomento, with the following functions, among others:

- Defining the goals of the port system as a whole and the general management goals of the Port Authorities.
- Approving the economic and financial programs of the Port Authorities, and consolidating their accounting and budgeting.
- Controlling the efficiency of the management of Port Authorities and the accomplishment of agreed goals.
- Co-ordinating the commercial policy of the Port Authorities, primarily in the international area.

The Port Authorities.

Port Authorities are responsible for administering and managing the ports under their authority. Among their functions are:

- Realisation, authorisation and control of maritime and land operations related to port traffic and services, within the port area.
- Planning, building, maintenance and exploitation of port infrastructure and most of the port superstructure and services.
- Concession of port services to private operators and regulation of other rights of using.

The Port Authority is managed by a Board of Directors and its President. The President is designated by the Regional Government. The Board of Directors consists of the President of the Port Authority, the Harbour Master, the Director of the port, representatives from the National and the Regional Governments, and other members appointed by the Regional Government from municipalities, Chambers of Commerce, business organisations and major Trade Unions.

Port partners.

The shipping agent is the physical or legal person who acts in the name of and represents the shipper or owner of the vessel, assuming full responsibility for paying the settlements which, from tariffs or other charges originating from the stay of vessels in the port, may be levied by the Port or Maritime Authority.

Services for handling cargo in the docks are given to private port operators/stevedoring companies with the Port Authority authorisation to operate in the port and, when they do not have sufficient personnel of their own to carry out their tasks, they must turn to the "Pool" Employment Society in each port to gather enough workers.

Customs brokers are responsible for obtaining the dispatches of cargo from Customs. They also perform other related services such as those relating to transit. These are private companies authorised by the Customs Administration, with whom they are insured. More and more in recent years, customs brokers are also becoming forwarders.

Forwarders are private companies which take on the organisation of all, or at least part of, the transportation services.

During recent years, one of the main priorities of Spanish legislators has been to clarify the role and responsibilities of each partner, specially those of shipping agents and forwarding companies.

Expected trends
The organisation of the State port system is regulated by a specific law dating from 1992, updated in December 1997. For that reason, no new major changes are expected in this sense in the short term. No major changes are expected either concerning the role of port partners in near future.

Due to the new primary role of Regional Governments in the port authorities, one may expect an increase competition between Spanish ports and a strengthening of the role of co-ordinated port communities.

6.3.16 United Kingdom

Ports are essential to the economy of the UK - around 97% of all goods pass through the ports - about half a billion tonnes each year - which represents some 80% of the total value of the UK trade. There are about 650 'ports' supporting diverse interests. It has been suggested there may be one port per 20km of coastline, though only about 100 ports can be said of commercial significance, with about half of all the UK tonnage passing through five major port authorities. About three quarters of all ports (in terms of tonnage handled) are owned by private companies, some are trust ports, the smaller ports and harbours may be owned by Local Authorities and only four remain in the nationalised sector. The latter sector only ever covered one third of the industry 'purchased' under the 1947 Transport Act: these ports have reverted to private ownership commencing in the mid-1980s when privatisation was well underway aided, in 1989, by the abolition of the Dock Labour Scheme. This Scheme had supported many restrictive labour practices - now the new arrangements allowed more flexible responses to be made by Port managers towards their customers.

The UK ports are fully commercial - they receive no State subsidies and derive their revenue from ship handling and cargo handling charges. Some ports also receive income from renting or leasing part of their estate or developing surplus land as property ventures. The ports are represented by three Trade Associations: the British Ports Association (BPA); the UK Major Ports group (UKMPG); and the UK Independent Ports Group (UKIPA). Both the BPA and the UKMPG are represented on the European Sea Ports Organisation (ESPO).

All ports of the UK (1996)	M. tonnes
Total Freight (excluding oils)	551.2
Containers & roro	114.6
Major Ports	
Dry Bulk	490.4
Liquid bulk (oil, petroleum & gas)	267.5
General Cargo	70.8

Generally, as port users are demanding better facilities (deeper berths, faster turnaround, and so on) it will be the bigger commercial ports who will provide these facilities, not the smaller ports who can not raise the development money through their Local Authority or their Trust Management. Further, it will be inevitable that mergers and acquisitions will take place in the UK ports industry - already we see Mersey Docks and Harbour Company taking over the Medway ports in 1993, and Forth Ports in 1995 bought the port of Tilbury in London and Dundee in Tayside - to note only two cases. The free market is quite uncertain - for instance, one might see the State-owned Port of Calais purchasing the Trust Port of Dover to consolidate their joint interests in freight and passenger movement.

Maritime Statistics

By 1st January 2000 the UK will have a new system for the collection of statistics related to sea transport of goods and passengers. This system will enable the UK to meet its obligations under the EU Directive on maritime statistics, which requires every EU country to collect detailed information on sea transport. The Directive came into force at the beginning of this year, however the UK obtained a derogation until the end of 1999 to allow time for a new system to collect the data to be introduced.

Appendix 7: Deployment of New Technologies in Participating Countries

7.1 Belgium

The circumstances arising in the European internal transport system have imposed the urgent need for its improvement. Considerable improvements could be obviously achieved through the better utilisation of the existing capacity offered by inland navigation and short sea shipping. In order to make this mode of transport more competitive and attractive for the customers on the transport market and to engage it in the multimodal transport chain, both technical and organisational decisions have to be considered.

In that sense, The Belgian Federal Government as well as the Regional authorities have initiated several research studies aiming at evaluating the financial, economical and socio-economical impacts of any decision related to traffic management or infrastructure investments. On the basis of these studies, guidelines for the improvement of inland navigation will be defined in accordance to the EC Global Transport Policy.

Among these studies we can highlight the following:

- Study of a development policy concerning waterway transport (defines the needs and requirements of the inland navigation users and the actions that should be taken in order to improve the sector) (financed by the Ministry of Public Works).
- On information and real-time management of operations related to waterway traffic (aims at defining a global schema of a telematic chain, the techniques as well as the equipment for communications and tracking. It determines also the potential users and the necessary information flow between them) (financed by the Ministry of Public Works).
- A mathematical model of Belgian waterways network (modelling of the inland waterways network and simulation of traffic by using new methods and concepts better describing the interactions in the fleet-infrastructure, the fleet composition and the traffic management) (National Research Program "Transport & Mobility" financed by the SPPS).
- Analysis of the inland waterways transport material and infrastructures and their adequacy for the transport demand (provides a tool for the decision makers enabling them to set up a well adapted policy for the management of the inland waterways traffic, the development of the fleet and the improvements of the infrastructures) (financed by the Ministry of Public Works).
- Inland NaVIgation Telematic "INVITE": the project is aimed at providing an overall architecture of the telematics system, which would improve efficiency of inland navigation in Europe. It is focused on an improvement of the operation of waterways by introducing telematics approaches in inland navigation. This will simultaneously improve the freight logistics and the traffic operation, and ensure a unique strategy to be adopted by both member states of the European Union and the Central and Eastern European countries in the field of inland navigation, financed by EC - COPERNICUS project.

Overview of telematics related to inland navigation and ports

Inland navigation faces a great challenge. It is politically of interest because of its environmental friendly character. However, there are tendencies which act in favour of road transport. It is stressed that every transport mode should pay its own external costs correctly -

in that case the position of the inland navigation would be strengthened. It is obvious that a better use of the existing free capacity offered by inland navigation would have a great positive impact on the European Transport System.

To be a realistic alternative to other transport modes, a good information exchange between the different participants in the transport process of inland shipping is necessary. Therefore in Belgium over the last few years a lot of initiatives have been taken to improve this information exchange. Telematics related to inland navigation concerns the information and communication systems and can be divided between traffic management systems and transport management systems.

In Belgium the majority of inland ports are public enterprises. They enjoy the status of autonomous ports. This status means that the ports are responsible for and manage only the infrastructure (road, quays, electricity, water) while the management and all the activity in the port are the responsibility of the private companies who rent the land. This means that the ports don't need to have a direct connection with users. Actually the telematics for inland ports are not in existence.

Overview of telematics related the maritime sector

In the maritime sector the ports like Antwerp, Zeebrugge support the interconnectivity via EDI. The EDI are used for the majority of messages but they still have some specific standards for some application.

The Port Authority (P.A.) of Antwerp includes the port-administrative department, the port-technical department, the port-financial department, the port-tug department, etc., and the local port VTS called APICS. The P.A. assumes the full control of the port activities (authorising port entrance/departure, planning of the port entrance/departure through the locks).

The users don't have a direct access to the APICS system. The interface between the users and the port system (APICS) is made by SEAGHA messages.

SEAGHA is the standardisation organisation for electronic messages in the Antwerp port. SEAGHA defends the interests of the Antwerp port companies in the UN/Edifact messages design groups on national, European and international level.

At this moment 40 SEAGHA messages exist. They are divided in several related groups for which there are user guides. The SEAGHA groups are:

- Container messages
- Messages between forwarder and shipping agent
- Conventional cargo messages
- Port Authority messages
- PROTECT (dangerous goods) messages
- Rail messages
- Messages for general usage

SEAGHA is involved in the following project:

- PROTECT (is a study group which studies the possibility of information exchanges about dangerous goods between ports of the North Sea. Hamburg, Bremen, Rotterdam, Felixstowe and Antwerp harbours are concerned by this project. In each of these ports,

there is an electronic mailing box similar to the SEAGHA one. It looks possible to connect these harbours together to simplify the information exchanges).

- MarNet (its mission statement is to provide a set of open and globally accessible information services to support logistic and multimodal transport operators. This is to enhance the competitiveness of the European and Mediterranean maritime ports, and the transport sector in general. To achieve this, the MarNet Project will set the basis for the creation of a multi-regional real-time logistics information networks).

The port of Zeebrugge uses the same VTS system as Antwerp (APICS) but the interface between the users and the port is called ZEDIS. The ZEDIS message has the same function as SEAGHA but is less powerful.

Future development in the maritime sector

- In the port of Zeebrugge the development of classic EDI will be less emphasised, and the future development will be based on INTERNET.
- In the port of Antwerp the development of EDI will continue together with an increase in the development based on INTERNET.
- An information system linked to the national competent authority for dangerous goods is under development between the ports of Zeebrugge, Antwerp, Gent.

Development related to inland navigation.

Several different studies are being undertaken to define a schema for a global telematic chain, to identify the potential users and the type of information to be exchanged between them. There is no large application of the possible scheme identified but, a limited on site test was done in the framework of the study mentioned at the end of this chapter. Political decisions are in preparation on the basis of the results of the above mentioned studies but any approved chain must be integrated in a Global European Telematic chain.

7.2 Bulgaria

The main three Bulgarian ports - Port of Varna, Port of Bourgas and Port of Rousse - are 100 % state owned public Limited Companies and all characteristic operations are incorporated within their structure. Meanwhile, a preparatory procedure for their privatization is under way. At that moment, there is no active centralized plan for new information technologies application in Bulgarian ports, but the Bulgarian Government encourages and supports activities and projects in that direction. A good example for that is the implementation of an EC supported Project for definition of telematic chain in inland water transport via Port of Rousse.

Every port has his own plan for elaboration of its information system, which is usually of restricted scope, in correspondence with processed cargo traffic. Most sophisticated system is the one serving the port of Varna.

The Port of Varna Information System

The basic objective of the Integrated Information Management System (IIMS) is to improve the integral port efficiency by modern information technologies implementation. The computerization and integration of the processing of the data reflecting the whole activity of the Port of Varna is effected on the grounds of several sub-systems:

- **Operation system** - it comprises the cargo and ship handling operations, the storage and shipment operations vehicle and railway handling included;
- **Container system** - it is analogous to the previous one but is dedicated to containerized cargo only;
- **Technical system** - it serves the technical operation and maintenance of the machinery and the material and technical resources of the port. It comprises also the material and technical supply;
- **System for the departments "Finance and Accountancy", "Labour and Salaries" and "Staff"** - it processes the information input by the other integrated sub-systems and solves its specific tasks, invoicing, statistics, analyses and such like included;
- **Management system** - it provides the basic current information for the managerial needs, statistical processing of data and such like on the grounds of the already input information in all other sub-systems, as well as in the functional departments, covered by the system. IIMS allows development with reference to the tasks supporting the managerial decision making like optimization tasks, expert systems, collective decisions making, video conferences.

The two-way communication with the "Finance and Accountancy" System and the Management System is a necessity for all sub-systems.

The separate sub-systems are built on the grounds of the LANs as Data Base Management Systems (DBMS) based on the "client-server" technology for distributed information processing.

The company's corporate network is configured on the grounds of the virtual commutation, the precise and full definition of the interconnections of the separate LANs and meeting the requirements of data integrity.

An Intra E-Mail system on the grounds of a dedicated Mail Server (same will be developed into an Intranet Server) is under construction just as is the case with the paperless message exchange of the 1-st layer described in the COST 330 Project, Chapter 7.

The problems of EDI aspect are the modern communication infrastructure building and the EDIFACT application for electronic document exchange.

The telecommunication connections between the Port of Varna and its partners, the state bodies included (Customs office, Police, etc.) are problematic in the aspects of communication and implementation of an integral EDI methodology.

7.3 Finland

The development of information systems for Finnish ports is carried out in co-operation with the Ministry of Transport and Communications through three principal projects:

- PORTNET, a national data base covering vessel traffic and it's schedules (the system is in use),
- BOPCOM, an additional information service for transport operators and their customers (based on PORTNET) and
- INTERPORT, a development project to create a national identification system for goods transport and, especially, for lorry drivers (first step and test site is in Port of Helsinki).

The follow-up of the traffic information upon the vessels is realised in co-operation with the port and the state authorities. Thus, the traffic information included in the PORTNET data system covers the whole country. The PORTNET will be revised, which will bring new qualities that are important to the clients of ports. In the BOPCOM project the most important ports are developing their data systems in order to improve co-operation with their customers. The ports operate as terminals and, naturally, as nodes where different modes of transport and operators meet. The goods are delivered by various transport companies and at the same time the responsibility for the goods is transferred from one party to another. To prevent criminality and to decrease labour costs new technology is put into use: this can improve and automate supervision. Verification methods are needed for tracking and tracing the transport units as lorries, wagons, containers, trailers, swap bodies, etc.

The Ministry of Transport and Communications has directed a project, which aims to develop a smart card based driver identification suitable for ports and all terminals. The project, called INTERPORT, is also an EU research project. The aim is to create one united national electronic identification system that could be used in all actions and by all actors in transport chain. INTERPORT is the first step and small scale testing of the smart card which will be used to automatic access control is in the port of Helsinki. Since the planning began a couple of years ago, it was decided to anticipate the future driver's card for the electronic tachograph of a lorry. Naturally, for this purpose the future citizen card (for common health care system) or electronic driver's licence may be as suitable or even better. Most important is that the card is safe (identification only with PIN-code) and managed by a third reliable party.

Merchant shipping in Finland is distributed between various ports. Some of the sea routes are difficult to navigate and, the nature on the routes is environmentally very sensitive. The control and guidance of the vessel traffic on our waters is demanding and piloting is necessary. During normal winters maritime transport requires ice-breakers or direct assistance to several ports. Because of this the Finnish Maritime Administration advances its organisation gradually to an office that follows, guides, and manages merchant shipping in real-time. A monitoring system is needed which will have the same features as in aviation control. This development will have some impact on the information systems of the ports.

For the management of the ice-breaker fleet the Finnish Maritime Administration has developed a guidance and control system called IB-NET (**ice-b**reaker **net**work) and for pilot allocation an integrated information network called PILOTNET. Both of them have an interface with PORTNET.

The Ministry of Transport and Communications of Finland is presently starting two three-year research and development programmes; the R&D programme for Intermodal Transport and the R&D programme for Transport Telematics. The Transport Telematics programme includes a goods transport aspect which focuses on the transport telematics of ports. The Intermodal programme includes a telematics aspect which focuses on port and terminal activities.

7.4 France

Presently four French sea port communities are using advanced information systems and telecommunication through port community systems that are managed by port authorities. These systems are linked to the French customs.

Two systems - Ademar and Protis - have run from more than 15 years in the two largest French ports. They were extended while implementing new computerised and integrated procedures like EDI, tracking and tracing, and management of hazard.goods.

The French government have no centralised directives for the implementation of information systems in port communities. It can only be expected that the current objectives of these community information systems fulfil regulations, improve the information flows and the communication between operators, and streamline their customs operations.

Only one governmental system is being developed in the maritime sector: "Triton" system is to aid the management and the transfer of statistical information to the head statistic department.

Most of the French large ports have Minitel servers. This explains the French delay for using Internet support when compared with other countries. However, some French ports have Internet Web servers : Le Havre, Marseilles, Dunkirk, Bordeaux. The development of such servers is going on.

The French government is supporting projects for the development of new information technologies in the sector of waterborne transport. Here the main objectives of the projects are the improvement of the organisation of transport chain through sea ports or inland waterway ports by using information systems and telecommunications. Some projects focus on the implementation of advanced information systems and telecommunication, and on the assessment of benefits on the organisation.

- **Improvement of intermodal chain between Marseilles and Le Havre**: The ports of Marseilles, Le Havre, port operators and SNCF are participating in this project - the objectives of which are to investigate the advantages and the necessary conditions to create a corridor between Marseilles and Le Havre to improve the distribution of goods to Central Europe.
- **Tracing and tracking of containers in the port of Marseilles** operating on the automatic recognition of characters, and with a video network.
- **Improvement of the operation in container terminal** and definition of advanced container terminal (participants: port of Marseilles, port of Le Havre).
- **Feasibility of information exchange system between inland waterway ports and their partners** (participants port of Dunkirk and port of Lille). The objective of this project is to implement low cost EDI solutions between sea ports, operators and linked inland waterway ports for the enhancement of intermodal transport using inland waterways.
- **Anticipated management of truck arrivals to container port terminals** by using advanced wireless telecommunication systems (participant : port of Le Havre).
- **Tracking and tracing of containers along the corridor Marseilles, Toulouse, Bordeaux** using new information systems and telecommunications.

There is no centralised and no harmonised national information systems for port communities. Nevertheless, a national effort exists to set up port co-operation for implementing modern information systems and telecommunication under the direction of the Ministry of Transport.

7.5 Germany

The port communities played a major role since the mid-seventies in the development of information exchange between them and their partners.

The two main North Sea ports, Bremen and Hamburg started linking their partners to their information and communication systems. These Port Community Systems, dbh Datenbank Bremische Häfen and DAKOSY in Hamburg, have existed for more than 20 years. Because a partner can be customer to both ports, both of them created links to their community systems. This meant the start of comprehensive information interchange, though not being based on a standard from the very beginning. Now both Bremen and Hamburg use state-of-the art-technologies for their communication links.

The ports of the remaining coastal Federal States of Lower Saxony and Schleswig Holstein followed these processes, and since 1990 Mecklenburg Vorpommern, another German Baltic Sea Federal State followed with its ports to build up similar systems.

Since the beginning the main target was to create integrated systems by regarding the ports as the main land/sea logistic interface.

To further develop the dbh Datenbank Bremische Häfen, Bremen built up the so-called Bremen Harbour Telematics (BHT), which is to put systems in touch. A "Port Data Plug Socket" is the technical feature to connect all common computer systems by adapting the various communication systems. As such, it forms a gateway for open telecommunications between heterogeneous computer systems. The system includes Terminal Operators, Port Authorities, Shipping Agents and Carriers, Forwarding Agents, Stevedores, Tally companies, Truckers, German Railway, Distribution Centres, and, last but not least Customs. The system offers to the transport industry active monitoring of orders and loading with event-controlled status information by using only one link.

The system comprehensively supports

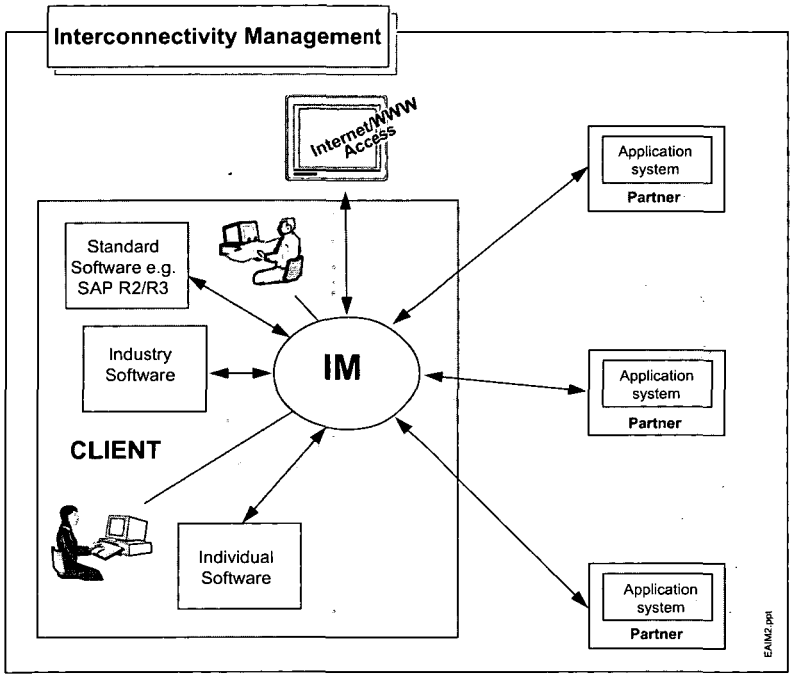
- the centralised tracking of port orders, the disposition and operation system of the terminal operator in respect to general cargo and containers,
- the locating system of carriages of the German railway and its information system (WADIS) including the customers for discharging and loading vessels and the local harbour railway system,
- the export and import control of customs including electronic custom procedures as DOUANE and ALFA,
- a link for hazardous cargo
- a vessel information system and
- a Bremen port operation system of the port authority for vessel traffic control, harbour dues and supervision of hazardous cargo.

The individual system themselves are interconnected.

With Teleport Bremen, the port community system provides a network node for world-wide communication. With this VAN, Teleport Bremen gives the possibility of using computer-computer network for data interchange by file transfer, various EDI formats, for instance EDIFACT, access to INTERNET, and a world-wide e-mail service.

The Port Community System of Hamburg covers similar systems like the above. The small and medium sized ports of Lower Saxony, Schleswig Holstein and Mecklenburg-Vorpommern have developed low cost solutions which meet their specific requirements.

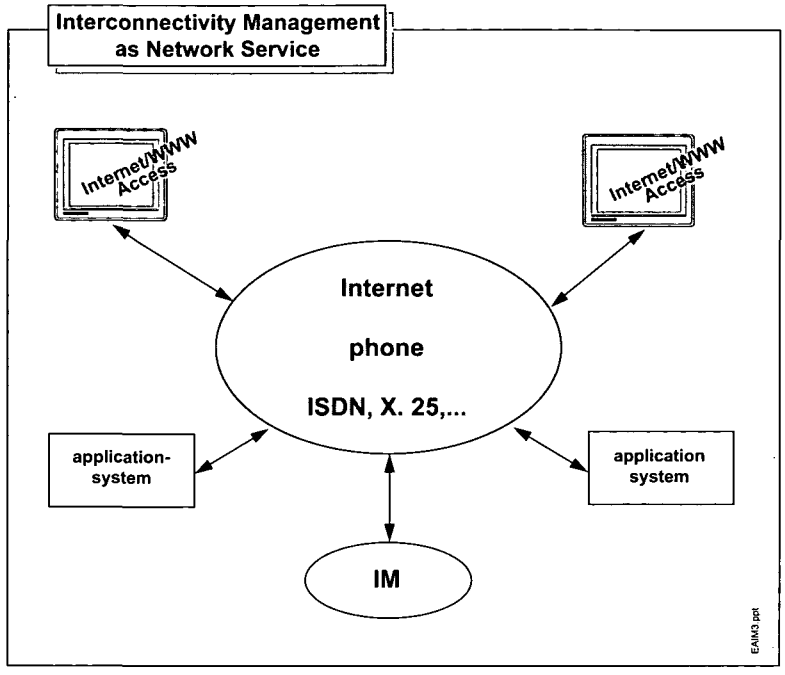
Referring to the paper-less message exchange and the demands on "bridging" software, an initial solution was developed for the Lower Saxony sea ports Emden, Wilhelmshaven, Cuxhaven, Nordenham and Brake between 1995 and 1998. Only small or medium sized enterprises are located in these ports. They have been not able to establish port community systems such as the universal ports Hamburg and Bremen are operating. Thus they developed a "bridging" software called NKI, which was the base for the telematic architecture of the R&D project BOPCom. In Germany the "bridging" software tools of BOPCom are installed in Lübeck and will be installed in Rostock, interconnecting various EDP systems of partners engaged in intermodal transports.



By use of such software tools for "Interconnectivity Management" (IM) various internal EDP systems of a company or authority can be interconnected on the inside and/or with external EDP systems on the premises of partners, via automatic EDI, without programming, only by setting of parameters.

Users without their own EDP system can participate by using Internet or Intranet techniques. In the simplest case they only need a PC with a browser for world wide web.

The IM can be installed on the premises of an user or it can be provided as a service within a network as a Value Added Service, as provided by TRADAV, the Port Community System of Lübeck.



The applications for data processing of the small and medium sized ports are similar to those of Bremen and Hamburg. This is because there was a national project for German Sea Ports (ISETEC; ISAN; ISAS; ISAM) which comprised State-of-the-Art-Technology for process controlled techniques and operational processes and efficient logistics using complex communication, information and data processing systems.

Although being of a very high technical standard, the systems in the German ports cover mainly layer one and two of the 4 application layers, but cover the all the application objects (see Chapter 7 for the framework). However the Terminal operators in the ports can use application systems fulfilling the requirements of layer 3. Now the German ports are prepared to realise layer 3 for all application objects, and have begun research and development for layer 4 (COREM). The latter of course requires the full commitment of all participants within the transport chain.

7.6 Greece

Concerning the new Information Technology Systems in Greece, the Piraeus Port Authority is already in the process of applying these technologies.

The Port of Piraeus and new technologies
A fundamental prerequisite for an increase of productivity and competitiveness is the use of the modern technology. The Piraeus Port Authority is totally committed to this goal, and is currently implementing a new information system - Port Management Information System (P.M.I.S.) in a way that it will cover not only today's procedures and operations, but will also be able to be expanded for the future needs of the port.

The port is already in the modern media era, having all its information compiled in a CD-ROM available to the public.

Increased used of the Internet is also foreseen in the future. This will involve online versions of tariffs and regulations, communication with shipping agents, cargo booking and tracking, statistics, and other port information.

Participation in European Union R&D projects

Piraeus Port Authority, in its quest for innovation and exploitation of new knowledge, actively participates in several research projects and initiatives, in the framework of the European Union R&D programs. This is one of the reasons that PPA has created the European Union Bureau, which, among its other duties, is responsible for those projects on behalf of the Port of Piraeus.

This participation, besides helping PPA's employees become familiar with new technologies and bringing them in contact with flexible and innovative applications on port-related functions, also helps develop international relationships in the context of the 4th Framework Program (R&D) of the European Union. At the same time, it enables the Port to be aware of emerging technologies and practices on port organisation and operation.

Basic information on the EU projects.

- POSEIDON: The objectives are to establish the principles, standards, and architecture for the interoperability of maritime Vessel Traffic Management Information Systems (VTMIS) at the local, regional and European level by the integration of VTMIS with advanced ship-to-ship and ship-to-shore communication, information and tracking technologies in order to improve the safety and efficiency of marine operations.
- INTERPORT: The objective of the project is to integrate the port and the ship operator in their customers transport chain with the accompanying information flow, thereby strengthening the competitive role of shipping in the intermodal transport chain. INTERPORT will implement and test a system of automatic identification equipment, integrating the physical movements of vehicles and containers in the ports with the information flow via the EDI network .
- EUROBORDER: The main objective of the project is to estimate how changes and development related to the Port will impact on the ports attraction as a node in the intermodal transport chain. Such measures could be changes and improvements to old procedures, but it could also incorporate development of new services.
- EUROSCOPE: In the framework of the project SCOPE/PORTS, several applications were developed in which lay the foundation for a telematic system in the passenger terminal of Piraeus, and which, in turn, provides the public with information on the traffic to or from the Port of Piraeus. EUROSCOPE is, in fact, a continuation of the SCOPE/PORTS project and it is aimed at improving the existing applications and developing new ones, for the management of traffic in the port's area, as well as at informing the public accordingly.
- MARTRANS: This project forms a part of the overall MARIS program (Maritime Information Society), for the purpose of improving the flow of information to the shipping sector. In particular, the program's scope is to interface the existing E.D.I systems between the port community, and to computerise ports which have not been computerised so far. It will create mechanisms for tracking the cargo and the ships.
- MARNET. PPA participates in the part of the project which concerns the monitoring of Transport Services to provide information on the location of the cargo, and its route, including the departure time and the time it will reach its destination. In addition, it will provide information on the cargo's condition, and on the obstacles that can turn up in the

transport chain, such as damage, or the shortage of the required documentation. Also, MARNET will offer a system of vessel tracing.

- BOPCom: PPA participates in the part of the project which concern the piling up and elaboration of information on the existing methods of communication and exchange of information and messages in the transport works performed in ports, among the various involved agencies, services, authorities, corporations etc., with a focus on the modules for Dangerous goodses and Linking with the Hinterland Transport.
- ECO: This project aims at the creation of a database which will incorporate all the necessary elements for the self-control and the determination of the correct environmental approach by the Port Operators in the wider Port area. ESPO's ECEPA program (Environmental Challenges for European Port Authorities), in which the PPA participated, is linked with the ECO project.
- PROSIT: This is a new project, and among the European Commission's leading pilot projects in the area of short sea shipping (SSS) and inland waterway transport. The objective of PROSIT is the promotion of SSS and inland waterway transport by the use of advanced computer and telecommunications technologies. Piraeus is part of the Mediterranean scenario, which, together with three other scenarios cover the rest of Europe. The project will be fully validated to assess the merits of the proposed technologies.

7.7 Hungary

Report on existing solutions and projects, at national and international level
We will underline the importance of the EDIFACT system in Hungary since we have the possibility to use the system with software developed by our staff.

Support of Interconnectivity and Interoperability
Here we can mention the HIR system with ETR connector. In these systems we can find a complex data base holding the following data:

- Vessels, Ships
- Ports
- Permissions of the authorities
- Infrastructures
- Technical examinations
- etc.

These data base can be reached by every department of the concerned port. It facilitates the work of the authorities and it was implemented in 1992.

Support of Tracking and Tracing of dangerous goods
We can note two software packs: the ETR Radio and the ETR Police. The ETR Radio has a connection to the Civil Protection (from January 1998), and ETR Police connects to the Water Police. The ETR Radio system traces the dangerous goods in the zone of Budapest, but the other system does not work simply because the Water Police have no interest in its use.

Support of planning of freight flow
The software called ETR Ports has the option to connect to the ports. The main object of this program is the processing and handling of the freight flow in the ports and it works in co-operation with the custom authority. The systems is under development and there are some test-results.

Critical issues of the development

There are three points that we have to mention.

At the determination of the communications standards they considered basically the Dutch IVS-MIB system in 1995. But there was no information exchange between the States because there is no contract official.

- The Hungarian Water-Police are not interested in using the ETR system: there is no legislation system to force the Police to use it. So for them it's supplementary work.
- There is a lot of project to develop in Hungary, and a lot of idea from our staff. The main problem is the financial resource for these projects. It could be real to create all sortie of software and program systems to every above mentioned projects too, not only to buy them.

Futuristic view of the development

As we have mentioned there are four Hungarian ports concerned in the COST 330 project:

- Gyõr-Gönyû
- Budapest-Csepel
- Dunaújváros
- Baja

We will see the development in the frame of these ports.

At this time Gyõr is under privatisation. It will be realised by a concession tender which will be declared in February 1998. If the privatisation is successful, they will realise a 50 millions dollars investment within 10 years - the financial participation of the Hungarian state in this project will be 11,5 millions dollars (10 MECU). The port will have a free (industrial) zone too which should be an accelerator for industrial and commercial activity.

In Baja the Hungarian Ministry of Transport decided to create a roro terminal. The work has begun with a 1.7 millions dollars investment (1.5 MECU).

Concerning Csepel, there is a Government decision to privatise it. But at Dunaújváros there are only plans for the development.

Finally, we have to mention Nagytétény (south of Budapest), where will be a roro terminal and container terminal.

Water transport related issues of the Transport Policy in Hungary

The main waterway has been upgraded to a transcontinental line following the inauguration of the Danube-Maine-Rhine Canal, but the section from Austria to Budapest has a serious obstacles in the form of insufficient navigation depth. Along the other big rivers there are no modern freight ports meeting current needs. Thus, the progressive and continuous development of the waterway on the Danube should be a strategic target. In the long term, by constructing the Danube-Tisza canal, a possibility will be provided for access to regions beyond the Tisza by inland waterways. The agricultural considerations of such a development are also important.

The most important targets of development of the water transport are:

- digging out the section Austria-Budapest of the Danube waterway in conformity with ecological viewpoints and shipping class VI/b of the European standard (to at least a draught of 2.5 m);

- it is specially reasonable to revive the Danube so price efficient sea/river navigation is developed which would enable the direct access without transhipping to the Mediterranean basin, as well as to the Ukrainian and Russian inland waterways;
- development of the ports of national interest (Gyor-Gonyü, Budapest-Csepel, Dunaujvaros, Baja, Nagyteteny), building other ports necessary for combined transport, and the construction of suitable road/railway links to the ports;
- updating of the inland navigation fleet because of the transfer of its emphasis from south-east to north-west and noting the condition of the existing fleet - 50% of which should be scrapped. This situation suggests a one-time technological change which cannot be achieved without State support, but it must take into account the industry policy related to the repair of ships.

Ports

Current situation
There is a lack of links between the Danube and the large size cities as potential sources and destinations of goods to be shipped by water transport. The lack of port capacity is disadvantageous for carriers and customers as well, and this fact decreases the economy and competitiveness of this transport mode.

The density of the waterway network in Hungary is very low compared to the EU average and to the network-density of other land transport modes (25%).

It is not possible to finance the implementation of the infrastructure of the missing public ports only by private sources. After a long period of missing public investments to this area, the full market-orientation of the not existing network of ports is not a realistic goal.

Strategy of port developments
The development is planned in three different groups of ports

- public ports of country interest: (6 ports are in this category: Gyor-Gonyu, Budapest Csepel, Nagyteteny, Dunaujvaros, Baja, Szeged). The majority ownership has to be held by State owned or concession companies looking to the financing of the infrastructure development and the operation
- regional ports could be market-driven and thus financed and owned by private sector
- ports of local interest will be financed by the private sector

State has responsibility only for the development of the first group. State's responsibility is limited to the provision of the technical standards in the second and third groups of ports.

The government's resolution of December 1996 decided to create the Gyor-Gonyu port in the framework of a concession. In February of 1998 call for tender will be issued. In the next 10 years, according to expectations, cc. 10 billion HUF (1 DM = 114 HUF) (44 MECU) will be invested in the development of this port with the State's contribution of 2-3 billion HUF (11 MECU) providing the necessary infrastructure outside the port. The preparation work has been already begun before the end of 1997. So far 531 million HUF (2.3 MECU) have been used for this purpose.
At the other public port, Baja, the construction of a roro combined terminal has been started at a cost of 230 million HUF (1 MECU) of public funds. Additional sources from the Environmental Fund at 114 million HUF (0.5 MECU) have been allocated.

A government's resolution decided the creation of public port in Csepel: its realisation is in progress.

Preparations are underway for the development of a roro and container port in Nagyteteny. The lack of financial sources makes the progress slow.

Similarly the further port developments at Dunaujvaros and Szeged are limited to the design phase.

The underdeveloped network of the Hungarian public ports would require an investment of about 3 billion HUF (13.2 MECU) per year over the next one and half decades but the available fund covers only a small part of the requirements.

7.8 Ireland

Existing Solutions and Projects

Connectivity
Apart from the specifically dedicated network connecting the Customs administrative system, the only service providing commercial EDI and electronically based solutions designed for the Freight industry is the ICARUS service. This is operated by Cargo Community Systems Ltd which is owned by 20 companies in the Irish freight sector, it has shareholding from Forwarders, Airlines and a Shipping Group. ICARUS was originally focused in the aircargo industry, it has now developed Shipping EDI services (Booking, Tracking and Tracing), EDI and Web based services for Trucking companies, Agents, Brokers etc. It is a fully multimodal EDI service provider. Due to the small size of the Irish market and to provide a single point of connection ICARUS has become a public Email provider and an Internet Service Provider and has integrated all these to provide additional services for all modes of transport, and increasingly providing solutions direct to the manufacturing enduser.

EU Projects
ICARUS is involved with Dublin Port in a number of MARIS projects such as MARNET and MARTRANS in association with Euromar and ports in the Mediterranean and other European ports. ICARUS was also a partner in WELCOM study, a West/East intermodal logistics corridor from Ireland (Waterford) to Poland via Holland and Germany using rail and inland waterways.

Planned System for Dublin Port (and Holyhead, Wales)
As stated, the main ports are growing significantly in volume. Dublin in particular has grown from a small European port to being a medium to large port in a short period. Traffic levels have almost doubled in 4 years; in 1994 tonnage was 9.5m tonnes and in 1997 it was 16.8m tonnes. Dublin Port Company have recognised the need for a Port System and together with Stena Port, Holyhead have funding from the Ireland Wales Maritime Interreg. The contractor for this is ICARUS-Cargo Community Systems Ltd. The new system will be the first phase of a full Port Community System (PCS) and initially will handle Manifest Exchange between the Shipping Lines and the Port Authority, Dangerous Goods, and Maritime Statistics. It is intended also to develop these services on a virtual web server so that they can be accessed interactively on the Internet by authorised users. Cargo Community Systems Ltd is interested on working on a neutral basis to provide Port Community Systems or different solutions for other ports.

Critical Issues
Many Irish ports have first to invest and develop their internal Information Systems before becoming involved in external communications such as EDI, and they are examining these and other applicable technologies. One of the key issues facing them is the availability of in-house IT expertise. They will however, be coming under pressure in the new competitive situation from other ports, better management information and from the demands of their customers for improved service and information flows.

Developments
The leading 8 Irish ports have in 1997 been removed from ownership and control of Local Government (Cities and local authorities) and set up as commercial State Companies with responsibility and control of their own finances. This sharpens inter-port competition and encourages the investment in technology and better business practise, with the objective of improving efficiency and productivity. This will be one of the main driving forces for the use of IT and telematics in the coming years.

Ireland is totally dependent on maritime transport and it must have excellent port facilities and the relevant electronic information systems to maximise port utilisation. The key role of logistics in industry is now fully recognised by the Irish Government and State Development Agencies and the need for greater use of IT and electronic communications which underpin it, in the ports as the vital national nodes for exports and imports.

7.9 Italy

From the point of view of the telematic links between ports and their partners the general situation already described in Appendix 6 is producing different and somehow contrasting effects:

- Private operators are more prompt in adopting quick-return investments, including EDI and Informatics. This is a positive factor that will facilitate the diffusion of informatics and telematics in ports.
- Private operators are less sensitive to standardisation issues and to general policy harmonisation: they will tend to solve the most pressing problems with readily available solutions, that can very often be tailored solutions which represent the best fit to their specific operational context.
- Major ports undoubtedly have even better opportunities today than in the past for a rapid growth, due to the concentration of operators in those areas with the most favourable infrastructure framework.
- Small ports, and especially small operators in those ports, will definitely suffer the negative effects of the existing and probably increasing technological gap as compared with the major ports.

With respect to the data collection and interviews carried out for COST 330 it was found most ports were in a transitory phase and they did not possess relevant traffic data. Thus data had to be directly collected by the private operators in the port, delaying and sometimes making more difficult the data collection itself because each actor was facing a completely new situation.

The "natural" Telematics evolution promoted by the low cost solutions offered by INTRANET/ INTERNET networks, should be monitored by a "super ports" body that should take care of :

- harmonisation of initiatives and actualisation of standard solutions,
- technical and organisational support to small operators (SME)
- co-ordination of inter-port initiatives at national and European level.

At least two different bodies satisfy the above specifications:
- the Port Authority, and
- a Consortium made by all (or part of) the operators in the port community, with possibly a significant participation of the Port Authority and of the local Merchant Chamber of Commerce.

A European port development policy should therefore promote, among others, initiatives and projects in favour of:

- the creation of Port Community Systems, especially in small-medium ports for SMEs.
- Inter-Port co-ordination and harmonisation of Port Community Systems Applications (including of course EDI), looking to intermodal transport.

Concerning the development of Port Community Systems (PCS), only a few Port Authorities in Italy have adopted PCS: Genova, Venezia, Trieste. And a number of private terminal operators must be considered, based in La Spezia, Leghorn, Voltri, Ravenna, with their own "proprietary" systems which are often linked to the EDI network of their biggest clients (like Maersk, Evergreen etc.).

Looking to the recent past, the main reason for slow development and non-standard implementations seems to be the relatively small size of the remaining ports and the not very demanding attitude of the local maritime operators, normally a few dozens with personal and direct daily contacts. But the overall framework is changing, "privatisation" and "globalisation" are becoming realities and the competition is getting more and more tough. There is some anxiety for a strategic survival which is increasing even in minor ports. Therefore, while the more advanced ports using EDI are nowadays in a quasi-steady-state with respect the organisation of the data exchange, the technology, and the number of partners, some of the other Port Authorities (for instance Savona) are planning or have already implemented data exchange with EDI systems and fibre optics backbones.

Of a basic importance for the commercial traffic organisation is the Data Network of Sea Navigation Italian District (NAVINET) which is now at its last stage of development. NAVINET is a complex WAN (Wide Area Network) interconnecting the LAN's of the main and peripheral sites (e.g. "Capitanerie di Porto") to support a number of services aimed at the safety of navigation, between ports and along coasts, for example tracking routes and offering Vessel Traffic Services (VTS.I).

7.10 Portugal

The Port Authority in Portugal is shared by Port Administration, Harbour Master (Capitania), Maritime Health, Excise and Emigration reporting to different Ministries with different rules and actions over the port partners. This dispersion of actions and resources makes difficult the development of new technologies connecting the Port Community. Nevertheless during the last six years the adoption by Port Administrations of a Governmental recommendation of 1993 to create "Vessels Dispatch Centre" (CDN) to concentrate Port Authorities and minimise bureaucracies has made it possible to devise a programme destined to connect and facilitate data and document interchange between port partners physically and electronically.

In 1993, Port of Sines developed an application named SINAVE (Integrated System of Vessel and Services) and installed a LAN linking all the port community. This application makes much easier the management of all the information related with the vessels, like time-sheets, cargo load and unload, services, suppliers, authorisations, HAZMAT notice to send to the National Port Authority. The application also sends alarms and mail, controlling all the access by electronic password and generates internal and EUROSTAT statistics, invoices and a status report with port movement and data is transferred automatically to the WEB page. This application was partially installed, in 1995, into the ports of Lisbon, Setúbal and Leixões.

Now is possible to implement in the main Portuguese ports - Lisbon, Leixões, Setúbal and Sines - solutions connecting their port communities using all type of physical means like optical fibre, high speed cable, telephone leased and dial lines, interconnecting different LANs with different servers and operating systems, using different protocols and services.

These ports have been linked by a proprietary mail service using a communication gateway since 1995, but now the evolution is to Internet. Thus these four ports and Aveiro are changing to global e-mail and to port the actual application to the INTRANET/INTERNET environment, supporting standard EDI, linked to VTS system – port and coastal – allowing a better port management and exchange of information.

7.11 Romania

At present there are no telematic networks which interconnect Romanian ports. Also, in Romanian ports EDIFACT is not running, although isolated tests are being undertaken. Referring to the network for data transmitting we can state that Galati, Braila, Giurgiu, Calarasi ports have performed tests of network connections using modems and dedicated telephonic lines.

Constanta port is to have a port information system in order to automate the port administration functions and responsibilities, at the first stage, followed by the connection to the information systems of the other ports and hinterland.

There are data exchange networks with a service provider at the national level which uses Romtelecom's communication segments. Port communities, like any other user, may use these networks by arranging closed groups of users with common interests in the field of goods transport with transit in ports. These networks for data exchange are:

ROMPAC Network

The public network of data transmission with ROMPAC packets exchange is offered by Romanian-French company RNTS ("Romania Telecoms Network Services") founded in April 1993, through the association of ROMTELECOM R.A. and TRANSPAC S.A.

ROMPAC network was inaugurated in September 1993 with three nodes and now actually 20 nodes equipped with ALCATEL hardware from PSX Gaunut. The nodes are interconnected with leased lines from ROMTELECOM and each node is connected because of security reasons with another two nodes (in a net structure).
ROMPAC network is a part of FRANCE TELECOM TRANSPAC EUROPE network, its connection being assured through many international lines. The network is permanently managed by a supervisor centre at Renews in France and, during the local working day by the Bucharest centre.

The ROMPAC network offers services of international standard of X.25 type both through direct access on leased lines from ROMTELECOM, and through indirect access by public switched telephone network. From 1996 the network administrator has been GLOBAL ONE.

LOGICNET Network

LOGICNET network represents the virtual extension of data transmission network based on SPRINTNET. There are 25 nodes in the main towns of Romania.

LOGICNET is a service network with added value, based on Sprint Outlook equipment of the third generation, with internal 32bits architecture, using X.25 packets. The network uses the phone lines of ROMTELECOM's infrastructure and has its own Command and Control Centre on the national territory. LOGICNET has it's own server of electronic post, connected to Sprint Mail and to other systems of electronic post (through X.400). There is assured access to the systems of the world: INTERNET, AT&T, MCI, DATAPAC, TRANSPAC.

Internet

In Romania the Internet usage is increasing continuously which has result in increasing the number of Internet and email service providers. The connecting difficulty consists in obtaining dedicated line to assure good data transfer since the communications telephone exchanges are almost all analogue, and the communications infrastructure administrator (Romtelecom) has not, for the moment, the possibility of improving these.

In the area of Romanian seaside at the Black Sea, by an interministerial co-operation agreement, it is in course of achieving a system for pursuing and surveillance of ship traffic, following the project INCERTRANS.

A GSM network through their two operators, MobilRom and MobiFon, covers the greater part of the national territory, especially the major towns and their connection roads. The service offered is of course varied and includes data transmission. A third GSM licence is due to be awarded soon.

Existing Romanian GSM networks

The GSM system

The GSM system in Romania started in the end of 1996 when the Romanian's Government and the Ministry of Communications organised the auction for a national 900 MHz cellular telephone network. The two winners of licenses were the Mobifon and Mobilrom consortia.

MOBIFON

Mobifon received its GSM licence on November 29th, 1996. The consortium is made up of:

- Telesystem International Wireless Corporation (TIW) - Canada
- Air Touch - SUA
- autonomous Regie - Romanian Post - national regie which:
  - includes 8000 distribution points and over 2000 post offices;
  - offers: location for the installations of aerials, selling points and offices for payment.
- Logic Telecom SA
  - national supplier of data communication services and communication through satellite;
  - experience in:
    - design and technical management for projects of telecommunication on Romanian territory;
    - consulting regarding the regulations of approvals and frequencies administration.
  - na Industries SRL - the 5th of one of the greatest private companies from Romania which has:
  - national network for production and distribution of electronic goods, home appliances and of telecommunication equipment;
  - many selling points.
- ISAF Society of Automatization and Railway Signalling

- experience in:
- telecommunications, signalling, automatization;
- designing (maintenance) of the networks and supervision of the construction plan, including civil works.
- Romanian Fund of Investments - mutual fund investments administrated by the Credinstalt Investment Romania SA.
- it offers consulting in the banking, financial, and investment field in Romania.

Mobifon started GSM services in Bucharest and in other important towns of the country, such as: Brasov, Cluj-Napoca, Constanta, Timisoara, Galati, Craiova, Braila, Bacau, extending these services also along roadways. It has in view to offer a mobile telephone service for 89% of Romania's population by the second semester of 1998.

- Equipment:

- GSM network infrastructure - supplied by Ericsson;
- micro-waves which connect the basic stations with the Mobile Switching Centre supplied by Harriss Farrinon;
- terminals (GSM telephones) supplied by Ericsson, Philips, Nokia, etc.;

- Services included in the monthly subscription:

- call waiting/holding;
- call forwarding;
- call barring;
- multiparty calling;
- optional: fax, data, short messages, use of Internet, voice mail;
- roaming services.

MOBILROM

MobilRom SA is a Romanian joint stock company with contribution of foreign capital, it received its license on December 6th, 1996. The founder shareholders of the company are:

- France Telecom Mobiles International (a part of France Telecom group) - shareholder of majority;
- 6 companies as Romanian juridical persons which act in the field of manufacturing, trading, installation, operation and service in telecommunication and information technology (including audio-visual);

- Mediacom;
- Unimedia;
- Tomen Telecom Project Romania;
- MBL Computers;
- Radcom;
- Alcatel Network Systems Romania.

- MobilRom offers services in 9 important towns of the country (Bucharest, Brasov, Cluj-Napoca, Constanta, Timisoara, Galati, Craiova, Bacau, Braila); extending these services as follows:

- by the end of 1997, at:
  - towns with over 100,000 inhabitants (25 towns);
  - roads with international traffic and some national roads (about 5500 km).
- by the middle of 1998:
  - the remaining national roads, about 7200 km;
  - all rural zones covered from the technological point of view by this configuration.

It has predicted a service for cellular mobile telephony for 23% of the Romanian population in the first semester of 1997, 71% by the end of 1997 and 89% by the second semester of 1998. According to the initial plan at the national level and with the series of number allocated to Mobilrom (call numbers which begin with 094), the theoretical maximum capacity is 1 million subscribers, with the further possibility of supplementing from another group. The objective of Mobilrom is to reach a significant number of users in the first year of licence.

Equipment:

- digital central office of high capacity;
- base radio station;
- digital radio-relays for transport of the traffic flows
- terminals;

The suppliers of the equipment necessary for the installation of GSM network (digital switches, radio-relays and equipment for transmission, without telephones) are Alcatel and Motorola. The other equipment (telephones, transmission equipment of high capacity) are acquired from companies like Nortel, Matra Communication, Nokia, Siemens, Ericsson, Lucent. The investment which MobilRom will achieve in the first 2 years (1997 - 1998) for acquiring GSM equipment will be about 150 millions USD (132 MECU).

MobilRom performs all additional services with added value for the cellular phone, such as:

- message transmitting;
- vocal message;
- fax;
- data transmission;
- roaming.

The standard used is ETSI European, related to the digital mobile cellular telephony in the frequency band of 900 MHz.

Till the end of 1998, all the Romanian sector of the Danube will be covered by GSM system, except the sector between km 955 and km 1040 which is an mountainous zone with low population and without economic interest.

Other networks in shipping industry

Paging system
The paging system in Romania is represented by eight companies which offer services of one way messages transfer in all the cities greater than 100,000 inhabitants and along the most important roads. The Romanian sector of the Danube and the Black Sea is covered by the paging system only around some ports: Constanta, Mangalia, Tulcea, Galati, Braila, Calarasi, Giurgiu, Zimnicea, Drobeta Turnu-Severin.

The paging system is available 24 hours, 7 days weekly and it ensures the confidentiality of the messages and the possibility of calling from ordinary phone. The offered services include group messages.

INMARSAT
The INMARSAT Satellite Network is used in shipping industry only by sea-going ships. Satellite communication in inland waterway transport was used only during the field trial on COMSINE I. The only company which used Inmarsat C network was NAVROM Galati. There was three MDT installed on the NAVROM ships and one at the dispatchers. At this moment all the MDTs are operational, but not in use. The facilities offered by this network satisfied the user's purposes, but due to the small numbers of equipment which this company was endowed the information circulation was low being limited to the ship carrying this system. Generally, the messages are satisfactory, and there is a preference for messages sent in the Romanian language.

There are no immediate hopes for a system extension due to financial difficulties which the company undergoes in this period of transition towards private property. The system created by COMSINE I project is appreciated regarding the report of data transmitted vs. cost.

7.12 Slovakia

Information systems and new technologies in water transport in Slovakia
In Slovakia transformation process proceeds and this has influence on development in port environment. The main ports, Bratislava and Komarno, have been operated for many years as state enterprise. Transformation process started by creation of state owned corporation SPaP a.s. (Slovenska Plavba a Pristavy - Slovak Navigation and Ports) and in near future it will finished in privatisation.

Strategy of data transfer
At this time advanced information system in Slovak ports is only future. There is data communication system in the Port of Bratislava but it is closed system only for needs of SPaP.
With reference to the goal of project COST330 "Teleinformatic links between ports and partners" it would be useful to look closer at organisation of Slovak Navigation and Ports

(SPaP a.s.). SPaP is created from several operational divisions managed by General Directorate.
This partition shows that in the view of the project some of the divisions inside company must be taken as partners. Thus the strategy in the field of data communication has two levels. One level is inside company where all divisions of SPaP are in logistic chain and outside structure where are all other partners share or exchange information. In case that we do not look at data flows as internal problem there are two important things :

- Technological base of these data flows - that is communication infrastructure. From this depends quality and speed (not only from technical point of view) in which we can gain information.
- Structure of gained information. If we are able to give our information to partners or if this information is in the form suitable in standard form for partners.

Concerning first sphere of problems (infrastructure) it is the problem to be solved in port. When we do not answer these questions or the answer will be wrong we will not be able to convey relevant information to any partner. That is why a project of construction of optical backbone has been started. The optical net which will be able to connect ensure connection of all important points in port area. This covers all existing connections done by modem terminal net. All communication needs will be fulfilled in this way and the structure will be good base for creation of complex internal information system suitable for conveying information towards outside partners.

The other area of problems is to assess at what level in logistic chain port would like to pass or better to say which of the partners will have detailed information and which will have general information. The question is if it is important to give particular information about individual consignment or after finishing activity (finishing of load of barge). Each of this access needs different strategy in data flow. In the first case there must be access from outside and for the other it is possible only to send information to partners. We can say that when the port is taken as the connection point for different kinds of transport where main characteristic is cargo flow shore-water or water-shore it is not possible to cut telematic information only to water transport hinterland. It is also important to give relevant information to other partners. We mean other navigation companies using push technology - pushers and barges. This creates interrelation. Port need to know what is also in hinterland and not only what is coming from water.

In the data flow process the most important is content. We can add form to the content and then propose communication channel. At this moment for non-structured messages telex and fax are used. With reference to nowadays trend Internet e-mail is growing very rapidly. It is limited to text messages which form is obligatory to two engaged sides only. In spite of the fact that this data communication refine knowledge and builds better operation they can not be final decision for communication. There is need to come to compulsory structure of messages accepted by all partners. Very close to this standard is UN EDIFACT. There are providers in Slovakia who offer EDIFACT and these days translation of the forms to Slovak language is being done. That is why we suppose that this way will be used also in SPaP.

New technologies in connection to EU
It is very easy to reckon plenty of nowadays new developments or directions in the field of information technologies and present possibilities of application in SPaP lay-out and possible benefit for the companies in the port. The first question could be problem of communication infrastructure in areas used by SPaP or for using in each division. In the port of Bratislava the

infrastructure will be based on optical wires which is now in construction. Completely different needs come from River Transport Division. Considering navigation area from North Sea to Black Sea a standard communication system ought to be implemented but this is question of the future and this problem touches all states in inland waterway system in Europe. One solution implemented in Slovak navigation could be Inmarsat system which not only provides communication possibilities but also in combination with GPS can create dispatch systems with information about position of a ship. Standard maps are not suitable for this purpose - special waterways maps should be used.

Communication to partners and remote points (agents in foreign countries) changes from telex and fax to E-mail by means of Internet. The most reliable way will be using of EDIFACT standards. In closer relation to EU Slovakia wants to co-operate in different EC projects. The most interesting is SPHERE which relate to small and medium ports. Project MULTITRACK which has the goal to track position of cargo in the whole logistic chain water, rail and road covers all needs of SPaP. Also outputs from COST330 could be used for strategic decisions in water transport area in Slovakia. SPaP very closely co-operates in the project COMSINE I and COMSINE II. VUD, Department of Water Transport, Bratislava is a partner in this project supported by EC in the programme COPERNICUS.

7.13 Slovenia

The Port of Koper has a well founded EDI technology with developed software solutions working also with non-standardised EDI documents. They are co-founders of a networking specialised company ATNET.

ATNET company manages the information exchange network, which has been established for the support and to make easier the distribution of documents between the port of Koper authorities, Customs, Shipping and Forwarding Agencies. More precisely, ATNET provides IP links between the port of Koper, Customs Administration, Intereuropa (one of the Slovene main forwarding / shipping agents) and the port authority. On the other hand, there are X.400 / X.25 EDI connections towards Slovene Railways, Customs Administration and Agency of the Republic of Slovenia for Payments. They are planning to establish direct EDI links with suppliers of goods, e.g. Volkswagen.

Currently the port of Koper co-operates with Triport to establish the identification system (BAR codes), which is intensively used in car industry - partners from this segment plays a significant role in the port of Koper. Also Internet technology is intensively deployed, e.g. for marketing activities and added services, the port offers:

- an on-line version of the sailing list which is automatically updated every two weeks;
- sailing list arrival time calculator, which enables one to find the best and fastest connection by entering expected departure and arrival time to a selected world port.

The port of Koper is taking part in some international projects.

Regarding other partners - many of them are starting to intensively use internet and its services, where it is especially worth to mention Slovene customs administration, which already uses security services in electronic business for more than a year.

7.14 Spain

Major telematic initiatives are taking place within commercial ports. Aside from the revolution implied by the Internet itself, the use of telematics among Spanish ports is becoming more widespread, partly because of the pressure of big international companies and the leadership of the port authorities.

Vessel and cargo services providers.
Big import/export companies, ship owners and international logistic operators are increasingly forcing local *shipping agents* and *forwarders* to establish stronger telematic links. EDI is used according to the need of exchange structured information; but transactions (e.g. cargo booking, notice of arrivals, freight invoices) are usually under their own formats.

Stevedoring companies are also pressed to establish smoother information exchanges with shipping and forwarding companies (e.g. for stowage plans or unloading instructions).port operators/stevedoring companies in some ports have benefited from the know-how and co-operation of the port authority in implementing EDI applications under EDIFACT standards (e.g. BAPLIE message for the bay plan).

The port authorities
Port authorities, mainly within those ports with higher general cargo traffic, are considering telematics not only as a tool to improve their competition but as a strategic way to achieve an increase in traffic.

It is within this framework that we should note the active co-partnership of some port authorities in R&D projects at a European level (Barcelona in BOPCOM, Bilbao in INTERPORT, Santander in MULTITRACK and Valencia in MARNET and INTRARTIP).

In recent years, port authorities, in close co-operation with Spanish Customs, have been working to facilitate information flows and the customs dispatch of goods with the support of telematic applications. The main result of this co-operation has been the EDI based COMPAS system, described below.

Using the know-how gained with the COMPAS system, some port authorities have developed other EDI applications in co-operation with shipping agents and also with *Portel*. With regard to shipping agents, the dangerous goods declaration (IFTDGN) and the corresponding authorisation from the Port Authority (APERAK) is being used in some ports; some port authorities are also using EDI to supply *Portel* with statistical data. These port authorities have sometimes developed other EDI applications, for which there has been limited demand from the port community.

Ente Público Puertos del Estado and Portel
Puertos del Estado - which is responsible for co-ordinating and controlling State-run ports - is following the main telematic improvements of port authorities and also participates in European R&D projects (e.g. EUROBORDER, INTERPORT).

Portel is the result of a joint initiative between Puertos del Estado and Telefónica -the traditional Spanish telephone operating company-. *Portel* offers outsourcing of information technology and advanced telecommunications services to Spanish port communities (EDI Clearing House, Internet services, Intranet, etc.).

Based on agreements with the General Directorate of the Merchant Navy, *Portel* is the National Centre for the Notification of Hazardous Goods carried by sea, co-ordinating the application of EC directive 75/93 (HAZMAT) with other European Centres. *Portel* has also been charged by Puertos del Estado to provide Eurostat with statistical data via EDI (GESMES) from the State-run ports.
In 1996, Portel, SeT (Genoa) and GYPTIS (Marseilles) founded the European Economic Interest Group - Euromar. The port authorities of Genoa, Lisbon, Marseilles, Piraeus, Valencia and Barcelona are honorary members of Euromar, who's goal is to consolidate the benefits of information technologies and telematics applications in the area of maritime transport activities for the Mediterranean region. Euromar is participating at present in the *MARNET* and *INTRARTIP* R&D projects.

Customs
The COMPAS System was developed by the Agencia Estatal de Administración Tributaria as a single system for goods traffic inside any customs area on Spanish territory. The system is EDI-based and runs under the EDIFACT standard. At present, it supports two main procedures: the manifest and the SAD.

With regard to the manifest, the Port Authority acts in most cases as the mailbox for receiving the manifests (IFCSUM) from the shipping agent. The Port Authority notifies the shipping agent the manifests that pass the computer filters (CUSRES). Next, the Port Authority sends the manifest to the customs (CUSREP and CUSCAR), who sends back an acknowledgement of receipt (CUSRES) to the shipping agent through the Port Authority.

The customs broker transmits the SAD (CUSDEC) to Customs. Customs replies (CUSRES), rejecting the message, requesting an inspection of documents or requesting a physical inspection of the goods. The system immediately sends the rejection/acceptance and the requests for documents or physical inspection; if there is no action from Customs within a set time, the system sends acceptance of the release of the goods.
The transmission of manifests via EDI is largely used in the main commercial ports of general cargo; the transmission of SAD is implemented in all the customs areas in the country. The communication is done to a large extent through the IBM VAN; for the manifest, but some ports also use basic phone or dedicated lines.

Carriers
There are no significant telematic links between the railway company RENFE - which operates most of the Spanish railway network - and their port partners. The same applies to trucking companies, with the few exceptions of certain large international companies or pilot projects.

Expected trends
Concerning telematics, a rapid increase in Internet/Intranet solutions, to the detriment of implementation of new EDI applications, is expected in the short term. Existing EDI applications can be expected to spread among the other commercial ports, driven mainly by Portel. It may also be expected that there will be an increasing pressure on port community systems from shipping agents, forwarders and customs agents, who are already demanding systems that are consistent with other port communities and transport modes.

Port authorities of the main international ports with general cargo will continue to promote and facilitate the use of telematic links between port partners. Their main efforts will probably be towards:

- the integration of present information services and data interchange applications under unique platforms, and
- the promotion of IT and EDI use as a "label of quality" of the port community.

The trend towards outsourcing telematic applications will probably depend on the experiences from the few ports with outsourcing agreements.

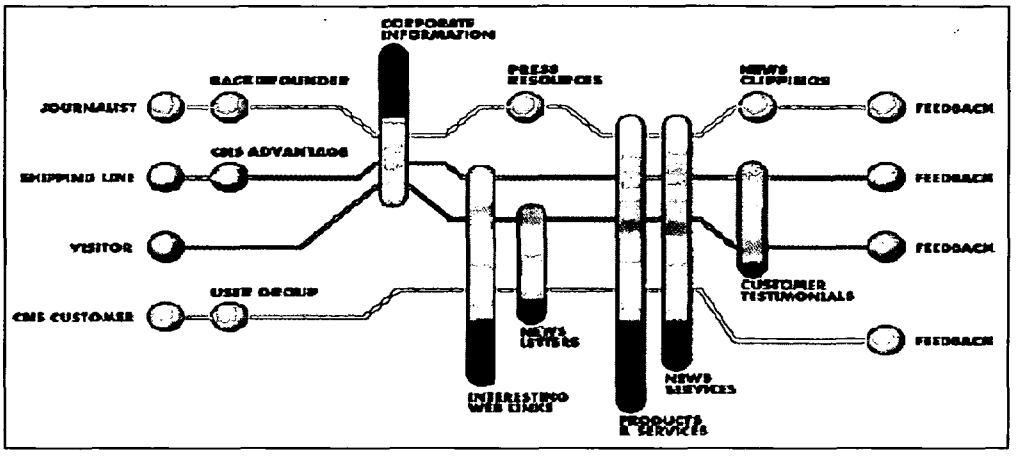
7.15 United Kingdom

In keeping with the strongly commercial inclination of the UK ports, we see two other organisations who strive also to support the port community. They proffer integrated digital systems which link cargo handling at the port with Customs clearance and many other values added services. These firms are Maritime Cargo Processing Plc., and Community Network Services Ltd. Each are spin-offs from their local port operations management - the former at Felixstowe, and the latter at Southampton. Now these firms have extensive national and international operations to support logistics management. They can be thought of as running a port community system at a given port, but their actual reach is much wider than this given port authority in association with its partners.

For instance Maritime Cargo Processing Plc (MCP) was set up to manage, market and develop the port community system known as the Felixstowe Port Control and Customs Clearance System (FCPS). This was first implemented in Felixstowe in January 1984 and now services thirteen other locations, including sea ports, Inland Container Depots (ICDs), and an airport. The systems were introduced to help speed the flow of imports and exports, and as such has proved extremely successful - so a large proportion of official and commercial documentation which commonly give rise to delays has been eliminated.

Similarly, Community Network Services Ltd. (CNS), is a wholly owned subsidiary of Southampton Container Terminals Limited which in turn is owned by P&O Steam Navigation Company and Associated British Ports. It has a team of over 30 skilled technical staff to handle hardware operations, network management and systems development. CNS provides total systems management and centralised dedicated support 24 hours a day, every day of the year by operating two computer suites - one operational and one on permanent "hot standby" thereby offering its clients a guaranteed service level.

One of the earliest networking applications developed by CNS was the Direct Trader Input (DTI) network which facilitates improved control and speedy clearance of consignments through Customs. Using DTI, importers, agents or authorised parties gain access to the UK Customs' computer systems to process Customs entries. These users currently number over 800 and between them process over 38% of the nation's Customs entries. Their systems are based in 40 of the UK's major ports, airports and Inland Clearance Depots including London, Southampton, Birmingham, Manchester, Leeds; and the Express Parcel Operators at Heathrow, Gatwick and Stansted airports.



CNS route map of its WEB Services (see http:// www.cnsonline.net)

For a number of the major UK ports, CNS has extended their initial service to embrace the wider requirements of a port community. For example, in the Ports of London, and in Southampton CNSNet is linked with the port operational systems giving users access to added value services such as information on vessel movements, bay plans, the tracking of cargo through the port, and inter-port communications.

Typically both these organisation strongly embrace the emergent Internet technologies for electronic commerce as one of their base services, to support the national collection of port statistics, and in leading the developments in electronic commerce in the UK (see the Maritime Statistics directive and the ECA documents below).

UK implementation of the EU Maritime Statistics Directive
This an extract from the first of a series of newsletters to be issued by the Department of the Environment, Transport and the Regions (DETR).

The aim of the newsletter is to keep persons informed of the latest developments in the lead up to full implementation of the EU Maritime Statistics Directive on 1 January 2000, and also to enable those affected by the Directive to provide some feedback on DETR proposals.

The Directive requires the collection, throughout the European Union, of statistics on freight traffic, vessels and passenger traffic and to supply the data to the Statistical Office of the European Communities (Eurostat) information relating to maritime traffic through its ports. The DETR is responsible for collection in Great Britain whilst the Department of Economic Development is the responsible Department in Northern Ireland. The DETR had established the means to collect data on vessels and passenger traffic.

However, the Department needed to develop new systems to collect the necessary freight traffic data, and during 1997 appointed a group of consultants to assist in developing these systems. This group consists of the following organisations:

- MDS Transmodal, a leading supplier of statistical data to the transport sector;
- Maritime Cargo Processing plc, the operator of several port community systems,
- Community Network Services Ltd, the operator of several port community systems,

- Electronic Trade Services, an independent software consultancy specialising in EDI,
- Alcatel Telecom Software & Services, a major French telecommunications company which has carried out pilot studies for the European Commission on the implementation of the Directive.

In October 1997 the DETR published a booklet entitled *Implementation of the Maritime Statistics Directive in the United Kingdom - A Guide for Industry.* This booklet sets out the background to the Directive, explains the data which has to be collected and provides an outline of the implementation plan: the text can be downloaded from http://www.mdst.co.uk.

Finally we should note the UK is particularly active in studying all aspects of electronic commerce.

ELECTRONIC COMMERCE ASSOCIATION (ECA)

This group is acknowledged as the UK's leading centre of information and advice on electronic commerce. The ECA aims to encourage improvements in industrial, commercial and governmental efficiency by offering independent advice, guidance and practical solutions to enable organisations to make the most effective use of electronic commerce. Formed in 1987, initially as the EDI Association, over the past two years the ECA has progressively expanded its activities to embrace the growing e-commerce market.

A not-for-profit organisation, the ECA represents a broad community of users, potential users, industry associations and vendors drawn from virtually every sector of the UK economy. Of its 550 members, 75 per cent are users of Electronic Commerce techniques. The ECA practises what it preaches and makes extensive use of a World Wide Web site from which new members can join on-line. See http://www.eca.org.uk.

Appendix 7a: New Technologies - Internet based EDI

EDI has undergone some conceptual changes since it is introduction. At the very beginning it was used in a store and forward manner on dedicated leased or public telephone lines. Since then a strong penetration of internet technology appeared and in the last years it became clear that internet would be the main environment for doing business electronically. Therefore the scope of this paper is to show the technical foundations, conceptual aspects and possibilities for migration of EDI business to the internet environment.

Introduction

It has been concluded long time ago that electronic data interchange (EDI (ANS96, UN93)) has many advantages over traditional way of doing business with exchange of paper documents. At the very beginning EDI was run over public telephone lines or leased lines with low bandwidth in order to interconnect mainframes for documents exchange in a store and forward manner. The quality of these lines was sufficient only for exchange of short alphanumeric electronic documents.

Few years later a dedicated data networks technologies emerged (e.g. X.25 (ITU98b, ITU98c)), where a specialized provider began to take care for the quality of bulk data transmission. However, due to lack of services, complicated and expensive solutions, this technology did not serve as a world-wide environment for conduction of electronic business. the situation has changed rapidly with the penetration of TCP/IP technology (Rey85), i.e. internet.

The real environment for electronic business (which includes EDI) turned out to be the internet. The technology was open, specifications were freely available and it was based on a very successful client-server paradigm with many useful services. This especially became true at the beginning of 90s with the introduction of a World Wide (WWW) technology. This technology is based on:

- very intuitive graphics interfaces,
- integration of all kind of data (text, images, sound, video)
- technology that could be used on almost every existing platform.

This has serious implications also on EDI technology. Alphanumeric messages are no more sufficient, as information systems are getting based on object-oriented database management systems, which handle data in its natural way. This means not only text, but also graphics, video and sound. Such database management systems and information systems built around them are becoming tightly integrated into WWW and we are talking about Web-centric information systems.

Short overview given so far presents the starting point for this paper. However, the aim of this paper is to show the directions in which EDI business will be developing in the near future. The paper is organized as follows. In the second section an introduction on EDI and internet technology is given. In the third section it is justified why the integration is needed. Besides, possible solutions to achieve these goals are discussed. There is a conclusion in the fourth section with the prediction of future development.

Short technical foundations of EDI and Internet services

Electronic Data Interchange - EDI

EDI is computer-to-computer communication for exchange of business information in a standardized electronic form without a human interaction. It uses strictly formatted messages that represent business documents. Examples of such documents include purchase order, purchase order acknowledgment, etc.

It is clear that EDI needs a strong standardization basis. There are defined various sets of message types, where (using a standardized syntax) each message is composed of a sequence of standardized data elements. To further enable the exchange of documents, the definitions and sequence of control data elements in message headers and trailers are needed. And to provide security, steps for providing authentication, confidentiality and integrity are needed, as well. With such an approach a possibility for assembling, disassembling, and processing of messages by computer is given.

There are two families of standards for EDI - the first is X12 standard family, developed by ANSI Accredited Standards Committee X12 (ANS96) in the USA, the second one is EDIFACT(UN93), developed by United Nations Economic Commission for Europe - Working Party Four (UN/ECE/WP4), used mostly in Europe.

Internet / World Wide Web

Internet is the most widely available computer communication infrastructure around the world: It is based on commonly adopted TCP/IP family (Rey85) of standards with embedded services like e-mail, file transfer, etc. which can be all exploited for EDI. All that one has basically to do is to get an operable TCP/IP connection to the internet. EDI translating software and an interface to a proper application, like e-mail (Pos82) or WWW (Ber95), Fil97). The latter can also be seen as a kind of a global directory, which is competing with X.500 (ITU89a) solutions especially for the purposes of security infrastructure. Important properties, needed for EDI, like connectivity, address resolution and routing, can then be seen as given by default. Not to mention that strong competition in this field constantly brings prices down and results in better transport service and lower prices.

E-mail basics

Internet e-mail is based on a client - server paradigm, where servers are used to accept, route and deliver the e-mail over the network, while clients are used to compose and read it. Clients also interact with servers on behalf of users. The addressing scheme is strongly tied to Domain Name System (DNS (Pos84)), which is hierarchically structured. E-mail is one of the most commonly available services on the internet and the service itself is connection oriented.

WWW basics

As mentioned at the very beginning, the main service on the internet is becoming WWW. It is also based on client - server paradigm, but opposed to e-mail WWW is connectionless. For communication between clients and servers a HyperText Transfer Protocol (HTTP (Fil97)), is used, while the documents are exchanged in a HyperText Markup Language (HZML (Ber95)) format. The mesh of WWW servers already presents a kind of a global directory, which is functioning very effectively. Besides, WWW assumes "a minimal common denominator"

technology requirements and thus runs on almost every platform, being able to handle all kind of data (text, images, sound, video). And finally, due to intuitive interfaces, it became very popular in the last few year and as such the main application on the internet. Last but not least - one of the important side products of Web technology is a new, network oriented language, called JAVA (Cam96).

JAVA

Java language is based on Web philosophy and is tightly integrated into it. It is an object oriented programming language, based on applications and applets. Applications are standalone programs, while applets don't run standalone. They adhere to a set of conventions that lets them run within a Java-compatible browser in a standardized way, that is indepentent of the local platform (bytecodes). Logically, applets are embedded in HTML via a special tag and the execution starts after transfer of an applet bytecode over the network. This is a problematic task, therefore to reduce the risk, JAVA language is designed accordingly:

- pointers to random memory locations are forbidden,
- applets are not able to load code written in non-JAVA language,
- applets can not read and write files or start programs on browsers host,
- applets can make network connections only to the host that they came from.

Thus for JAVA the whole internet looks like a local resource, thanks to the Web based access from browser, which manages the network connection related business. the important feature of JAVA applets is also a planned implementation of cryptographic application program interface (API), which will provide digital signatures, message tests, key management. A general encryption/decryption for provision of confidentiality is planned in the near future as well.

Web Security - Secure Sockets Layer

In order to make Web infrastructure secure for business transactions, it is necessary to provide means for authentication, confidentiality and integrity. One of the most successful initiatives in this field is a Secure Sockets Layer (SSL (Fre96)), developed by Netscape Communications. SSL is a specialized layer that resides beneath the application level and above the network level. It takes care for provision of security services, as shown below:

HTTP	SMTP	FTP
	SSL	
	TCP / IP	

Figure 1: Position of SSL

The main attraction of SSL based security is its orientation towards support of X.509 public key infrastructure, which is a definitive direction for the Internet (Hou97). This infrastructure is based on a distributed directory (e.g. X.500 (ITU89b, ITU89c)) and a system of certification authorities (Cas (ITU93)) for issuing and revoking public key certificate. Such an infrastructure is needed to make possible all kinds of security services and to being intensively established within internet.

Electronic Commerce

Electronic commerce is intended for human to human interactions over the internet and it is being increasingly used. Until very recently, such business was conducted using unprotected

communication. One of the most current initiatives that is aimed for electronic business over the internet is secure electronic transactions (SET (MC96)). SET is expected to the first widely accepted way of doing business electronically over the internet. The main side products of SET, useful for EDI, are:

- some kind of public key infrastructure,
- some protocol specifications which can be use for specific EDI applications.

EDI over the Internet

It is now clear that it is no more a question whether to use internet for EDI or not. The open problem remains how to do this in the most effective way and how to overcome the main obstacles.

EDI via e-mail

Using Multipurpose Internet Mail Extensions (MIME (Bor93)) and properly configured user agents, EDI documents can be automatically sent and delivered over the network from one EDI processing program to another. The processing of EDI messages would require:

- an e-mail address for exchange of EDI messages,
- agreement on support of X.400 mail header fields and their implementation,
- agreement on cryptographic protocols and key management,
- agreement on embedding EDI format within e-mail.

EDI via WWW

Due to its wide acceptance, WWW became a major player for conduction of electronic commerce, which includes EDI. Besides , information systems technology in companies is relying more and more on WWW technology (Web-centric information systems), they more it is natural to think about using WWW for EDI business. The processing of EDI messages via WWW would require analogous steps as mentioned above (see section EDI via e-mail) with additional need for compensation of connectionless nature of WWW, which should be done by EDI software.

Merging EDI and Internet

Although internet seems to be ready for running EDI, some general obstacles are still to be resolved before internet and EDI can be merged:

- HTTP relies on a hierarchical address space concept, called Universal Resource Locators (URL), that is strongly tied to DNS (Pos84) system. The similar holds them for e-mail, while EDI, on the other side, has a flat address space.
- WWW and e-mail world rely on X.509 (ITU93) certificates, while EDI relies on UN/EDIFACT certificates.

One possible solution would be provision of means for address translation to have interoperable EDI applications across the internet, e.g. a global distributed directory. Next, a translation between EDI certificates and X.509 world has to be done. Some important steps in this area have already been done within project DEDICA (DED97). Another possible solution would be a complete separation of EDI messages and security by deploying a specialized sub-layer, which would care for security services. One such possibility is Secure Sockets Layer. This would provide the necessary security to EDI by using the existing public key infrastructure without changes to EDI translating software. Such solution can be even more justified to be useful, as JAVA is penetrating electronic commerce and there already exist security solutions that are integrated into public key infrastructure.

Conclusions

It is clear that EDI will be conducted within internet, which already holds true for the rest of electronic commerce. However, appropriate steps should be carefully considered, as the standardization in this field is still an open question. This includes a definition of a complex non-alphanumeric electronic document or merging EDI into existing solutions like WWW or e-mail, where especially security turns out to be sensitive. It is likely that EDI specific security measures will be dominated by more general solutions for electronic commerce as a whole. Therefore it is wise to adopt EDI to be functional within general purpose security infrastructure.

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Appendix 8: List of Charts

To use the CD-ROM you need an INTERNET browser. To read the CD-ROM, simply insert it in your CD drive and it will run automatically.

Bold = **in the book**
No bold = only on the CD-ROM

Chapter 3 SCOPE AND WORKING METHOD OF COST 330

Section 4.1 PORT PROFILES

Section 4.2 IT PROFILE OF THE PORT COMMUNITY PARTNERS

Section 4.3 EDI PROFILE OF THE PORT COMMUNITY PARTNERS

Section 4.4 DANGEROUS GOODS INFORMATION MANAGEMENT, HAZMAT DIRECTIVE

Section 4.5 FUTURE IT PROFILE

European Commission
EUR 18284 - COST 330 - Teleinformatics Links between Ports and their Partners
Luxembourg : Office for Official Publications of the European Communities
1998 - 275 pp - 17,6 x 25,0 cm
ISBN 92-828-3679-7
Price (excluding VAT) in Luxembourg: 30 ECU

From October 1995 to April 1998, sixteen European countries took part in this Action with the aim to review and to assess the systems for interconnecting ports and their partners using various modes of communication (e.g. phones, fax, electronic mail, etc.).

To gather the data needed to describe the operation of the ports, a large survey was conducted throughout Europe based on an extensive questionnaire. In total, 106 port communities (77 seaports and 29 inland waterway ports) replied to the questionnaire.

The aim, following the data analysis was to derive exemplars and thus improve European maritime freight transport operations within the global logistic system through the exchange and dissemination of findings found in the course of COST 330.

On the basis of the findings, recommendations have been drafted, covering the following areas:

- Harmonisation of the working routines;
- Port Community Telematics;
- Training in the use of Port Community Telematics;
- A real standard for data content;
- Inland waterway ports: developing their role in European logistics;
- Harmonisation of legal rules and instruments for Electronic Commerce.

These recommendations have been targeted at the following audience:

- The European Commission
- The National Authorities
- The Port Communities and their partners
- The European transport and Logistics Sector