



USE IN DATABASE IN THE ADVANCED TRANSPORT MANAGEMENT SYSTEM – INTERFACE XML

**Maria Claudia SURUGIU,
Ionel PETRESCU**

Polytechnic University of Bucharest

INTRODUCTION

- The distribution of goods both on land and in air between two points (source-destination), is a complex process based on the use of intelligent systems for sorting, planning, distribution models using different transport goods, services and links.
- Route tracking and tracing systems are also used as a route monitoring systems.
- Components: computers, servers, readers, label (tag reader), GPS (Global Positions System).
- Information obtained by reading the label code (wagon, container) is transmitted to the mobile central station (MMS), then the public network (Internet) access to information server (IAS) by XML interface and tracking and tracing the route server (TTS).

XML

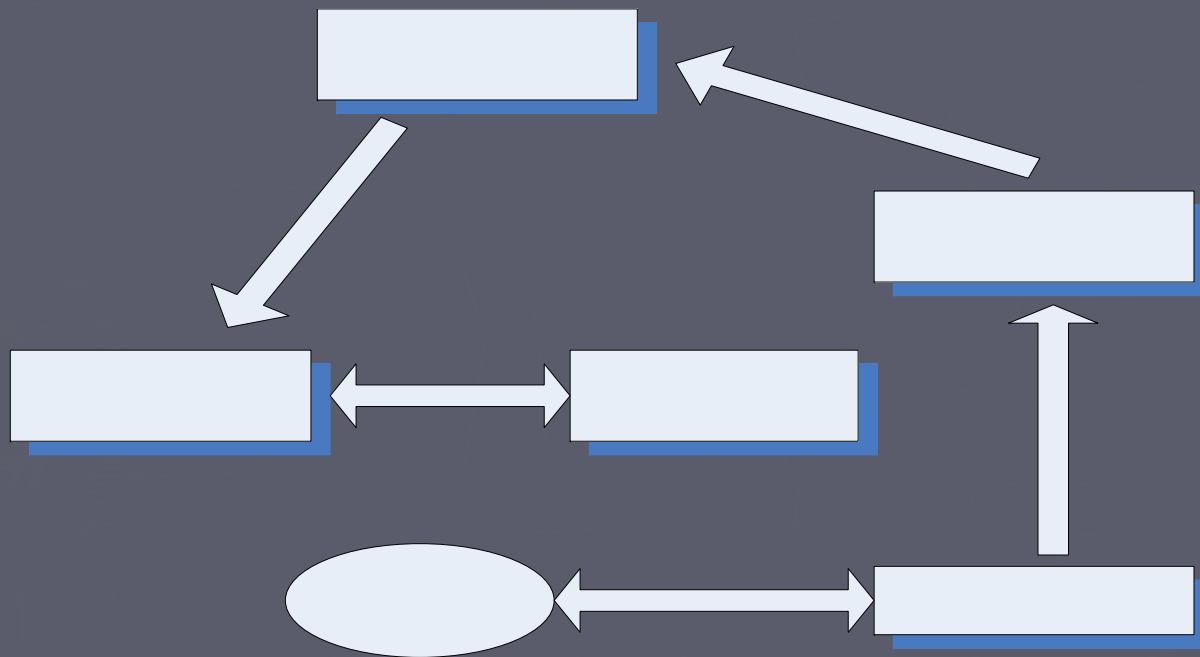
- ▶ XML (eXtensible Markup Language) is family of technologies that allow for platform-independent exchange of data.
- ▶ XML formatted data is contained in a document and that document is accessed by other systems.
- ▶ Within XML DB (database) the user can publish relational tables to XML as well as creating tables from XML.
- ▶ XML DB allow offers advanced XPath and XQuery to store, retrieve, query XML documents. Microsoft's SQL.

XML FEATURES

- ▶ To collect information once and then use them in various ways.
- ▶ is not limited to a single format can be used in any type of document, management system databases or spreadsheets.
- ▶ gives a greater portability of data management by providing an easy way of sharing information and making it suitable for business and especially for e-commerce

XML and Query Processing

- Various commercial vendors have also developed Structured Query Language (SQL)-like constructs to query XML documents. For example, as stated in [XMLSQL], the Oracle XML SQL utility has developed techniques for transforming XML constructs to SQL constructs and vice versa.

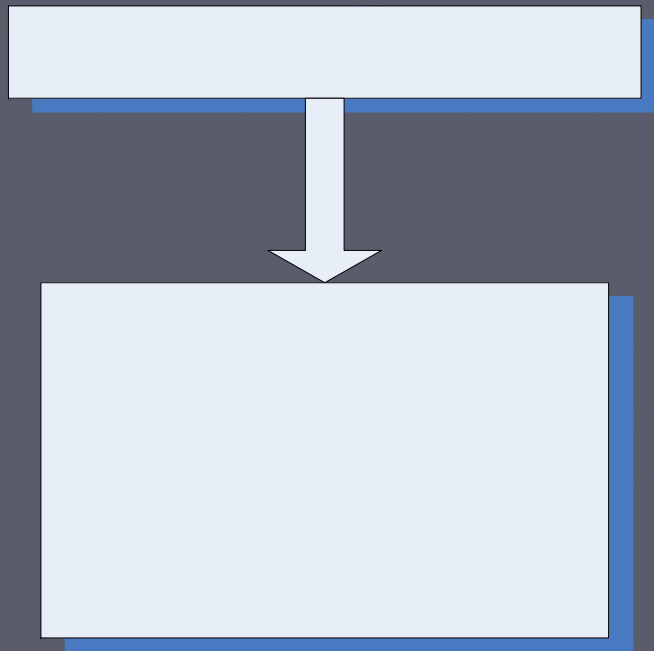


XML and query processing

USER INTERFACE
MANAGER

Applications of XML to Information Management

- ▶ Although XML applications to data management are somewhat more mature than XML applications to information management, some work has been reported in this area, especially with the advent of the semantic Web.

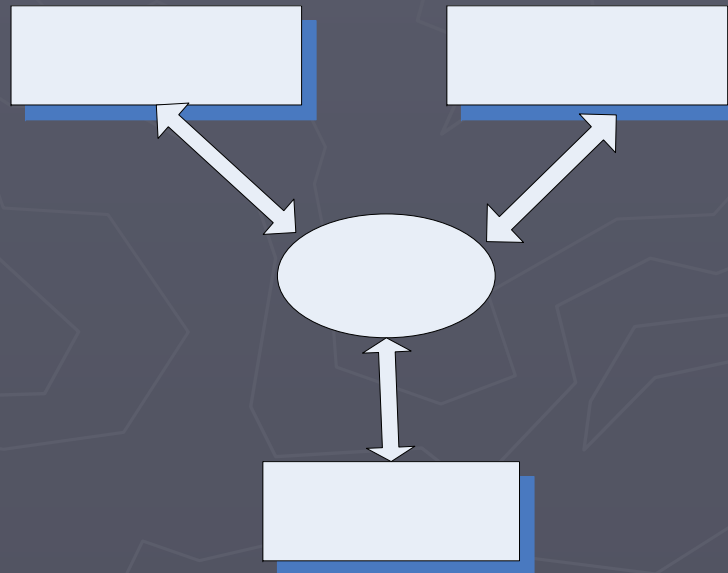


XML and Information management

XML Applications in
Management

Decision Support and XML

- ▶ Decision support is a combination of technologies including data management, data warehousing, and data mining;
- ▶ This means that documents have to be well represented. In addition, we need to understand the semantics. That is, XML, resource description framework (RDF), and the semantic Web will become critical technologies for decision support.



XML and decision support

Example: Steps To Accomplish

1. Register the XML schema with XML DB
2. Create a relational table to hold both relational data and XML documents
3. Load an XML document into the table
4. Write an SQL query to retrieve
 - ▶ Whole Document
 - ▶ Data from both the relational fields and the XML document in the same query
5. Update an XML field
6. Create Indexes

Example: The computer system for tracking cargo containers

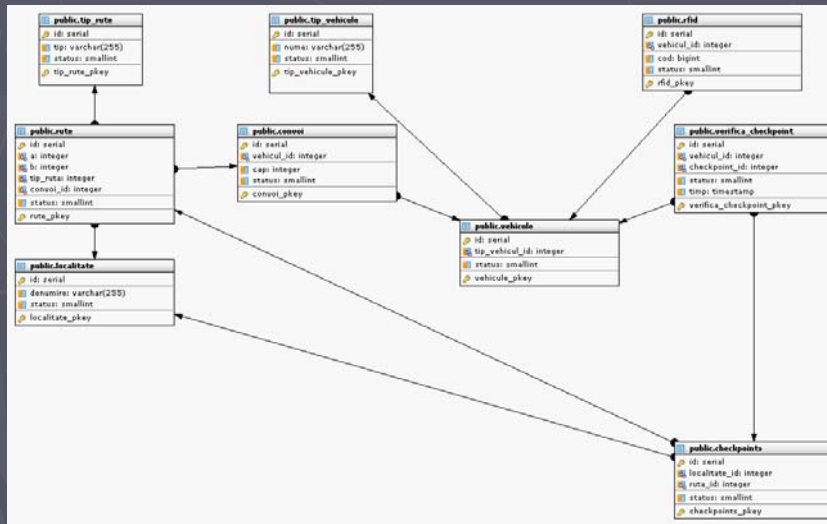
- ▶ The set of elements involved in processing and transmitting data electronically make up a computer system.
- ▶ The computer system presented in this paper aims to improve and streamline the transport of goods by real-time monitoring.
- ▶ The role of this system is to allow the dispatcher to make decisions in a short time and when reading the results gathered from RFID systems installed at checkpoints.

Computer system

The computer system consists of three components:

- ▶ Software needed for processing data collected by RFID reader;
- ▶ Database where is stored date;
- ▶ Graphical interface, allowing an operator to easily view the information and effectively.

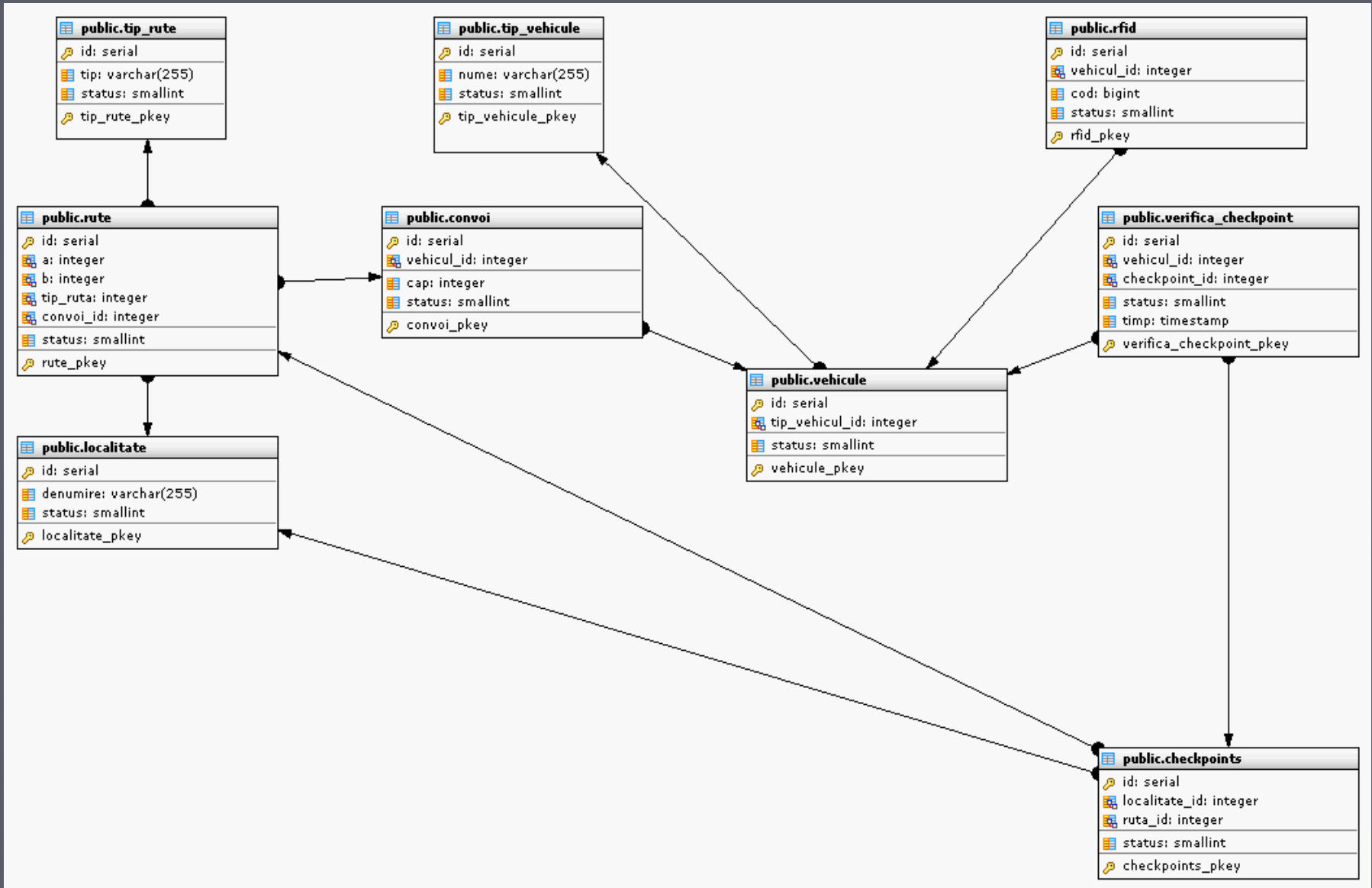
Adaugare date in raport: Punctul de control: Braila - Vehicul (#ID): 1 - Cod: 10000001 - Status: - OK - Vehicul identificat
Adaugare date in raport: Punctul de control: Buzau - Vehicul (#ID): 1 - Cod: 10000001 - Status: - OK - Vehicul identificat
Adaugare date in raport: Punctul de control: Braila - Vehicul (#ID): 2 - Cod: 10000010 - Status: - OK - Vehicul identificat
Adaugare date in raport: Punctul de control: Buzau - Vehicul (#ID): 2 - Cod: 10000010 - Status: - OK - Vehicul identificat
Adaugare date in raport: Punctul de control: Braila - Vehicul (#ID): 3 - Cod: 10000011 - Status: - OK - Vehicul identificat
Adaugare date in raport: Punctul de control: Buzau - Vehicul (#ID): 3 - Cod: 10000011 - Status: - OK - Vehicul identificat



DATABASE

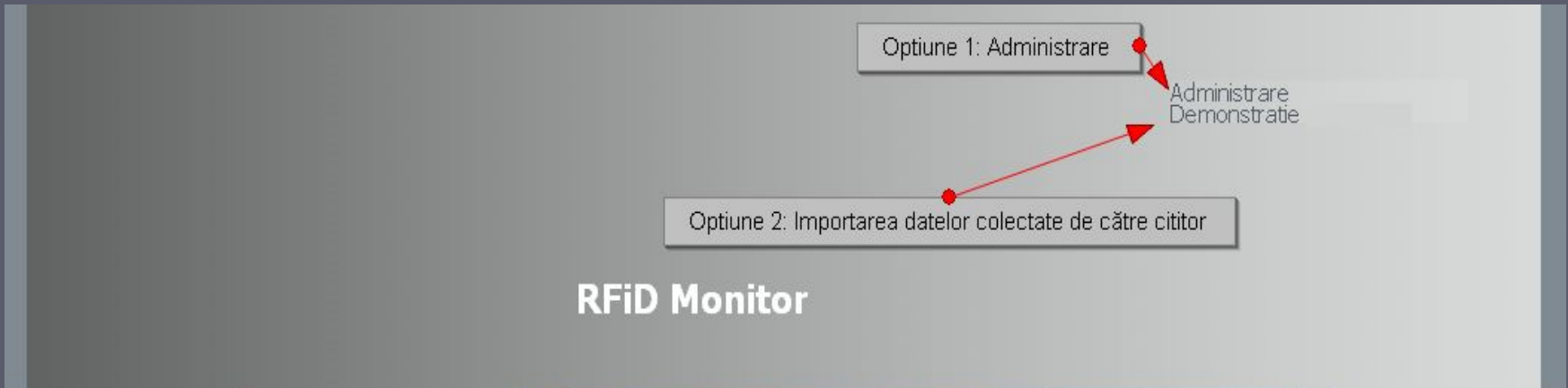
- ▶ The database considered language was used postgres SQL.
- ▶ The postgres SQL supports large data processing. It is a fast server, running times of queries are very low.
- ▶ The role of the database is to keep all states checkpoints RFID system of routes available. Such tables are built independent from those that can not work without the self.
- ▶ It will create tables in the following order: city, route type, vehicles type, vehicles convoy, RFID, routes, checkpoints, checkpoints check.
- ▶ Database design is composed of the following tables: route type, vehicles type, vehicles, cities, convoy, Rfid, routes, checkpoints, checkpoints check

Database structure



Ex. Application management and monitoring

Home



RFiD Monitor



Choose the option "Manage" operator sends the data management module relating to vehicles, routes, convoys, checkpoints and data received from the reader.

ADMINISTRARE RUTE
ADMINISTRARE LOCALITATI
ADMINISTRARE TIPURI RUTE
ADMINISTRARE TIPURI VEHICULE

ADMINISTRARE VEHICULE
ADMINISTRARE CONVOAIE
ADMINISTRARE CODURI RFID
ADMINISTRARE CHECKPOINT-uri

ADMINISTRARE VEHICULE
Adauga un nou vehicul

Optiune: Aduagarea unui nou vehicul

Meniu de administrare

ID#	Tip	Status	Optiuni
#4	Locomotiva	Activ	Sterge Edit
#1	Vagon	Activ	Sterge Edit
#2	Vagon	Activ	Sterge Edit
#3	Vagon	Activ	Sterge Edit

Optiune: Editarea unui vehicul

Optiune: Stergea unui vehicul

Proprietatile vehiculului, dupa cum urmeaza:
#2 -> identificatorul unic al inregistrarii
Vagon -> tipul vehiculului
Activ -> se refere la starea vehiculului, daca sa nu se poate utiliza

ADMINISTRARE RUTE
ADMINISTRARE LOCALITATI
ADMINISTRARE TIPURI RUTE
ADMINISTRARE TIPURI VEHICULE

ADMINISTRARE VEHICULE
ADMINISTRARE CONVOAIE
ADMINISTRARE CODURI RFID
ADMINISTRARE CHECKPOINT-uri

ADMINISTRARE CONVOAIE
Adauga un nou convoi

Optiune: Inregistrarea unui nou convoi in baza de date

Meniu de administrare

#ID	Cap	Componenta convoiului	Optiuni
2	Locomotiva	[1] Vagon [2] Vagon [3] Vagon	delete

Optiune: Sterge inregistrarea curenta din baza de date

Proprietatile convoiului, dupa cum urmeaza:
2 -> identificatorul unic al inregistrarii
Locomotiva -> Vehiculul ce conduce convoiul

Lista vehiculelor din convoi ce sunt conduse in cazul prezent de "Locomotiva"

ADMINISTRARE RUTE
ADMINISTRARE LOCALITATI
ADMINISTRARE TIPURI RUTE
ADMINISTRARE TIPURI VEHICULE

ADMINISTRARE VEHICULE
ADMINISTRARE CONVOAIE
ADMINISTRARE CODURI RFID
ADMINISTRARE CHECKPOINT-uri

ADMINISTRARE CONVOAIE
Adauga un nou convoi

Formularul cu care se pot adauga noi convoaie in baza de date

Vehicule:

Vagon Vagon Vagon Locomotiva

Alege CAP CONVOI

Alege...

Save

Din lista de vehicule, unul trebuie sa conduca convoiul

Lista de vehicule disponibile

ADMINISTRARE RUTE
ADMINISTRARE LOCALITATI
ADMINISTRARE TIPURI RUTE
ADMINISTRARE TIPURI VEHICULE

ADMINISTRARE VEHICULE
ADMINISTRARE CONVOAIE
ADMINISTRARE CODURI RFID
ADMINISTRARE CHECKPOINT-uri

ADMINISTRARE RUTE
Adauga un nou rute

Menu Administrare

Optiune: Aduagarea unei noi rute

ID#	Plecare	Sosire	Tip Rute
	Galati	Bucuresti	Marfa - Cai Ferate - CFR

Convoi

Cap convoi: Locomotiva

Componenta:

[1] Vagon
[2] Vagon
[3] Vagon

Optiuni

delete

vezi localitati intermediare

Proprietatile rutei, dupa cum urmeaza:
1 -> identificator unic
Galati -> Localitatea din care pleaca convoiul
Bucuresti -> Localitate in care ajunge convoiul
Marfa - Cai Ferate - CFR -> tipul rutei

Componenta Convoaiua

Listarea checkpointurilor asociate rute

Optiune: Stergere inregistrari

The journal entries in the database that informs the operator about the vehicle situation

[ADMINISTRARE RUTE](#)
[ADMINISTRARE LOCALITATI](#)
[ADMINISTRARE TIPURI RUTE](#)
[ADMINISTRARE TIPURI VEHICULE](#)

[ADMINISTRARE VEHICULE](#)
[ADMINISTRARE CONVOATE](#)
[ADMINISTRARE CODURI RFID](#)
[ADMINISTRARE CHECKPOINT-uri](#)

ADMINISTRARE CHECKPOINT-uri

[Adauga un nou punct de verificare](#) | [click aici pentru a reveni la lista de checkpoint-uri](#)

LISTA EVENIMENTELOR:

Nr. Crt.	Vehicul	Checkpoint (Localitatea)	Verificat	RFID	Data si timp
1	Vagon (#3)	Braila	Neverificat	2351111111111	2009-05-26 13:10:59.277
2	Vagon (#2)	Braila	OK	235252252525	2009-05-26 13:09:40.484



Tabelul cu rezultatele obtinute la trecerea convoiului prin punctul de control.

Advantages of using computer monitoring system:

1. The operator is informed in real time about the situation of convoy that made □□the freight train on a route.
2. Transport services are safe and more effective
3. It can be classified as AVL of Intelligent Transport Systems. The system could be extended to work with your GPS, and in this way will know the position and composition of the convoy is en route
4. It does not create impact on traffic flow
5. It is easy to implement and cost components used are minimal.

Conclusions (1)

XML-Type Summary

- ▶ XML can be stored one of two ways:
 - An XMLType column in a relational table.
 - An XML object in an XMLType table.
- ▶ Non Schema based XML is always stored as database.
- ▶ Schema based XML can be stored as a database or as a set of objects.
- ▶ Relational and external data can be exposed as XML using views.
- ▶ The view can be a relational view containing a column of XMLType or can be a XMLType View.

Conclusions (2)

- ▶ In conclusion, when faced with a decision on which database orientation is more appropriate for handling your denormalized data, consider flexibility, interoperability, and scalability.
- ▶ There is not a lot of data comparing the scalability, performance, and querying performance on Native XML databases as compared to Relational Database Management Systems, however based on the existing research, there is a consensus that the two are very different and one may not replace the other.