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**Economic Commission for Europe****Inland Transport Committee****Working Party on Customs Questions affecting  
Transport****Informal Ad hoc Expert Group on Conceptual and  
Technical aspects of Computerization of the TIR Procedure****Eighteenth session**

Geneva, 9–10 March 2011

Item 4 of the provisional agenda

**Financial implications of the introduction of the eTIR  
international system****Findings of the Ankara meeting (19–20 October 2010)****Note by the secretariat\*****Background and Introduction**

1. At its seventeenth session, the Informal Ad hoc Expert Group on Conceptual and Technical aspects of Computerization of the TIR Procedure (further referred to as “Expert Group”), mandated the secretariat to investigate the financial aspects related to the development and the maintenance of the eTIR international system (ECE/TRANS/WP.30/GE.1/2010/4, para. 12). Furthermore, the Working Party on Customs Questions affecting Transport (WP.30) stressed the importance of studying the experiences made within other IT systems in the Customs field, such as ASYCUDA (Automated SYstem for CUstoms Data), NCTS (New Computerized Transit System), TIR-EPD, SafeTIR, national Customs systems, etc (ECE/TRANS/WP.30/252, para. 26).

2. In order to facilitate the financial assessment, Turkish Customs authorities kindly invited the UNECE TIR secretariat for a meeting in Ankara, which took place on 19–20 October 2010. The aim of the meeting was to share among experts the experiences made by the Turkish Customs authorities in the course of the implementation of various IT projects and, in particular, the adhesion of the Turkish Customs administration to the revised Common Transit Convention and the connection to the European Union’s New

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\* This document was submitted late due to the timing of the session.

Computerized Transit System (NCTS). The meeting was attended by Information Technology (IT) experts with expertise in IT project management, software development, system architecture, network design and others, from both Customs and the private sector. This document reflects the findings of the meeting. The document is structured as follows: section I presents the system requirements and the assumptions made, section II describes the various options that have been considered as well as their advantages and drawbacks, section III details the development and maintenance costs of various option and section IV concludes.

## I. Requirements and assumptions

3. On the basis of the functional requirements laid down in Chapter 2 and 3 of the eTIR Reference model<sup>1</sup> and the available statistics on the distribution of TIR Carnets, the meeting formulated a set of preliminary assumptions with regard to the possible technical specifications of the future eTIR international system, as follows:

- The eTIR international system should be able to manage approximately 3 million TIR transports per year;
- Each TIR transport consists, on average, of 3 TIR operations;
- 1% of guarantees, issued by the guarantee chain, is cancelled each year;
- 50% of all TIR transports give rise to direct queries of the eTIR international system, from both Customs and the guarantee chain;
- 10% of all initially lodged Customs declarations are later amended.

Table 1 presents the assumed number of each message as well as the totals.

Table 1  
**Estimated number of messages**

<i>Various types of eTIR messages</i>	<i>No. of messages</i>
<b>Incoming</b>	
E1 – Register guarantee	3 030 000
E3 – Cancel guarantee	30 000
E5 – Query guarantee	1 515 000
I1 – Accept guarantee	3 000 000
I5 – Query guarantee	1 500 000
I7 – Record Advance Cargo Information	3 300 000
I9 – Start TIR operation	9 000 000
I11 – Terminate TIR operation	9 000 000
I13 – Discharge TIR operation	9 000 000
<b>Total Incoming</b>	<b>39 375 000</b>
<b>Outgoing</b>	
I3 – Get holder info	27 375 000
E7 – Notify guarantee chain	33 300 000
I15 – Notify Customs	3 300 000

<sup>1</sup> The versions of Chapter 2 and 3 are contained in Informal document GE.1 No. 2 (2008) and ECE/TRANS/WP.30/GE.1/2010/2, respectively.

<i>Various types of eTIR messages</i>	<i>No. of messages</i>
<b>Total Outgoing</b>	<b>63 975 000</b>
<b>Total</b>	<b>103 350 000</b>

4. The meeting was of the view that, from a technical perspective, the eTIR international system can only be constructed in an asynchronous manner and that, therefore, queuing and resending mechanisms need to be incorporated. In addition, a maximum response time at peak times of 5 seconds seemed to be sufficient to guarantee a smooth functioning of the system. Furthermore, the meeting stressed the importance of the type of information that would be exchanged through the eTIR international system. If the information is limited to text messages (e.g. XML), a mid size infrastructure would be sufficient and the storage and the databases response times should not be a problem. On the contrary, if the system would have to allow for the exchange of larger files (e.g. scanned images of attached documents, x-ray scanning pictures, etc) a much larger system with proper database clustering and larger bandwidth would be required.

## II. Options

5. The establishment of the eTIR international system will require both the development of software as well as supporting IT infrastructure. However, the meeting was of the view that, regardless of the type of IT infrastructure chosen, this would not significantly influence the costs of software development. Consequently, those costs are analyzed independently of the IT infrastructure and programming language.

6. Regarding the possible IT infrastructures, the meeting considered and evaluated four different scenarios:

- Construction from scratch of a high-end eTIR international system;
- Hosting the eTIR international system on specific servers within an existing data centre;
- Outsourcing the hosting and daily management to a specialize company;
- Deploying the eTIR international system on a so-called “cloud”.

7. Each option presents specific advantages and drawback, as presented in Table 2.

Table 2

### Advantages and drawback of the various options

	<i>Advantages</i>	<i>Drawbacks</i>
From scratch	Highly scalable; system ownership; high security and data privacy; flexibility.	Expensive; requires to hire highly qualified personnel; time consuming.
Existing infrastructure	Scalable; shared maintenance costs.	Dependent on existing infrastructure and maintenance personnel; limited influence on general security and availability policy.
Outsourcing	Scalable; no fixed costs.	Data privacy might be an issue.
Cloud	Maximum scalability; system can start at very limited costs (even for free).	No control on prices; data privacy might be an issue; portability of applications can be a problem (development can be cloud specific).

8. Building a solution from scratch would first require adequate and dedicated premises. These premises would then have to be connected to a broad-band internet connection and equipped with numerous safety and security features, before the IT infrastructure could be installed. Therefore, using an existing data centre within the UN, such as the United Nations International Computing Centre (ICC), the United Nations Office in Geneva (UNOG) or with third parties, such as the World Customs Organisation (WCO) data centre, would allow the sharing of costs with other users. The feasibility of such option greatly depends on the existing qualifications of the available data centres. For example, the eTIR international system will require specific minimal down times and permanent surveillance, which might not be a critical issue for the current users of those data centres. Outsourcing the hosting and daily management of the eTIR international system could be achieved through contracting either dedicated, shared or even virtual servers. Contractual arrangements should ensure the required availability, but the legal aspect of storing sensitive Customs data with a third party system would need to be addressed. To an even greater extent, the same legal issue arises with regard to the application of so-called “cloud” computing solution, regardless of the selected supplier (e.g. Microsoft Azure, Google App Sever, Amazon EC2, etc.). After some preliminary discussions, the meeting agreed that, because of insufficient experience with either of these last two options, no realistic cost estimates could be given.

### III. Estimated costs

#### A. Software development

9. The meeting estimated that approximately 3000 man-days would be required to develop the eTIR international system, divided as follows: analysis: 20%, design: 30%, software development: 30% and testing and training: 20%. The choice of infrastructure could slightly influence this estimate. If the software development would be undertaken by developers without experience in similar projects more resource might be needed. Furthermore, software development costs might vary significantly from country to country.

#### B. IT infrastructure

10. The infrastructure that will host the eTIR international system is of utmost importance, as the performance and reliability of an IT system greatly depends on it. Numerous alternatives are available within a wide price range. Nevertheless, hosting a reliable, large scale international system, which allows Customs administrations to exchange confidential information 24/7, requires a quality data centre. As stated before, the meeting decided to only consider the first two options (see paragraph 8).

11. The following table presents the costs of the various elements required to create a data centre for the eTIR international system from scratch (option 1) as well as to install the system within an existing data centre, such as UNOG or UN/ICC (option 2). The table does not include the data centre service fees (which would have to be negotiated separately with the data centre of choice), nor the rental cost of suitable premises to establish a data centre from scratch.

Table 3

#### Hardware and license costs of options 1 and 2

<i>Hardware and licences (in UDS)</i>	<i>Option 1</i>	<i>Option 2</i>
Cooling	60 000	

<i>Hardware and licences (in USD)</i>	<i>Option 1</i>	<i>Option 2</i>
Power supply	50 000	
Generator	40 000	
Heat-smoke detectors/fire extinguishers	50 000	
Backup/ disaster recovery	100 000	
2 Firewalls	80 000	
Storage (RAID) <sup>2</sup>	200 000	200 000
2 SAN <sup>3</sup> switches	15 000	
Load Balancer	15 000	
Layer 3 Switch (24 x 1000Mbps)	20 000	
<i>Servers</i>		
2 Database servers (each 2 socket / 4 core)	50 000	50 000
RDBMS <sup>4</sup> + Cluster licences (16 core x 0.5 factor )	300 000	300 000
3 Application servers	15 000	15 000
1 LDAP <sup>5</sup> server	5 000	
<b>Total</b>	<b>1 000 000</b>	<b>565 000</b>

12. Both options would require the presence of at least one network engineer 24/7. For option 2, these costs would be included in the data centre service fees.

### C. Total costs

13. The meeting estimated that the total cost for the establishment of the eTIR international system from scratch would range from 2.5 to 3 million USD at the international level. Maintenance costs of the system would amount to about 20 percent thereof, per year. Making use of an existing data centre would lower the implementation costs by approximately 500,000 USD. Determination of the actual maintenance costs under the second option would require further consultation with the various available data centres.

## IV. Conclusions

14. In view of the above findings of the meeting in Ankara, the GE.1 may wish to discuss the various options and, possibly, recommend one or more options for a more detailed analysis. It might also wish to share its own experiences in establishing national computing systems or on the use of private sectors services, including “cloud computing”, and in particular with issues relative to data protection and security.

<sup>2</sup> Redundant Array of Independent Disks

<sup>3</sup> Storage area network

<sup>4</sup> Relational Database Management System

<sup>5</sup> Lightweight Directory Access Protocol