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# **UNECE DETA Deployment Feasibility Study**

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Project Initiation Documentation

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## Document Location

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## **Executive Summary**

The purpose of this document is to define the project, to form the basis for its management and the assessment of overall success.

The document presents an analysis of the costs to implement deployment of the DETA application by UNECE. It presents various deployment options.

It concludes with the most suitable deployment option for UNECE.

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## 1. Background

The Administrative Committee for the Coordination of Work (WP.29/AC.2) of the World's Forum for Harmonization of Vehicle Regulations (WP.29) has been evaluating the possibilities for the electronic treatment of type approvals granted according to UNECE Regulations.

In 2006 requirements data (server performance, storage capacity, functional requirements, and financial support) was collected.

The DETA (Database for the exchange of Type Approvals) application has been developed for electronic treatment of type approvals granted according to UNECE Regulations. The system has been developed by T Systems.

Currently a similar system has been deployed by European Union (EU) for the exchange of Whole Vehicle Type Approvals on the premises of the German type approval authority (KBA) in Flensburg, Germany.

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## 2. Project Definition

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### 2.1 Project Objectives

The following are the projects objectives:

- To evaluate the various possibilities to deploy the DETA application, i.e. at the UNOG-ICTS Data Center, at a site managed by an external service provider, etc.
- To get an estimation of the cost for the various options.
- To select the best option in terms of technology and cost in order to deploy the DETA application under UNECE oversight/management.
- To deploy DETA in an environment providing 24/7 support.
- To assess the extent of financial extra-budgetary (XB) resources required to move the application/server from it's current location to being under ECE oversight/management.
- To explore the ability of ISU, ECE to oversee the application with the support of 1 or 2 XB staff hired to administer the application. The XB staff would be required to, but not limited to, administer the database and network, provide support, and to make enhancements as appropriate.

### 2.2 Project Scope

The scope of the project is to evaluate:

- The pros and cons of outsourcing versus in-house (ICTS, UNOG) for the hosting of the DETA server and middleware.
- Cost of the database, middleware application server installation and administration.
- DETA application developed using 2tier architecture (consisting of a database server and middleware).
- The project scope covers deployment options, cost of deployment and infrastructure, technical administration and management of the DETA

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application database and middleware. Costs related to development of additional functionalities or bug fixing of the front-end application is not included in this study.

### **2.3 Constraints and assumptions**

- The service and support offered by UNOG-ICTS is assumed to be 24/7 (this needs to be confirmed).
- As the data is of a confidential nature, any external service provider would be required to provide guarantees to this effect.

### **2.4 Requirements as indicated by Transport Division**

- The DETA application should run on an internet WEB centre (the data centre must be accessible via public internet) with adequate security infrastructure (2-Tier architecture).
- UNECE IT to oversee/manage database and middleware.
- DETA should be available on a 24/7 basis.
- The service provider (UN or external) shall establish a User Help Desk to support administrators working at UNECE as well as Contracting Parties (CP) and end-user requests.
- Minimum down-time in case of hardware failure i.e. a maximum of two hours. Database and middleware servers should be mirrored in case of a hardware failure a replica copy should be activated.
- To provide appropriate response times for administrator/end-user.
- User access via public internet using market standard internet browsers.
- Network security should be assured by HTTPS protocol.
- User identification/authentication by user-id/password.

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## **3.0 Access policy and security**

Each user shall be assigned to one single access group. Access groups enable an authority to control access to areas and resources in the application.

The DETA system shall have a main administrator (UNECE). One of the administrative tasks of the main administrator will be to manage access groups. For each CP, a single access group shall be defined. For each access group, the administrator shall define a group administrator responsible for a particular access group.

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The group administrator will have rights to manage users within their area of responsibility. Users within a group may have the right to either read only (RO) or to create/update documents (R/W) of his/her country. A user with R/W may only store type approval documents granted by the TAA (Type Approval Authority) of their CP.

### **3.1 Number of users**

The DETA database is designed to handle maximum 2,000 users. Based on a questionnaire carried out in January 2006 there will be 200 users with RO access and 100 users with RW access.

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## **4.0 Current Platform at KBA, Germany (EU)**

- Application Server: The application is based on Java (J2EE) on the server.
- Software: HTML, CSS and JavaScript (AJAX) on the client.
- Database Server system: Oracle (versions 10 and 11 at the moment).
- OS: The OS should be a Unix/Linux version that can be used to run one of the supported application servers.

The supported application servers include:

- J2EE
- Oracle Application Server 10.1.3
- IBM Web Sphere 6.1
- BEA Weblogic 10.3
- JBoss 4.2

The DETA application runs on an Oracle Database Management System (DBMS) version 10i and 11g.

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## **5.0 Deployment Options**

Since one of the prerequisites is that UN manages the application, as such, UNECE believes the external service provider option is not appropriate for this study. As a result UNECE proposes 2 options for the deployment of the DETA application.

1. ICTS, UNOG
2. UNECE/ICTS, UNOG



## 5.1 Service Providers

UNECE works with 2 types service providers to support its business and networking requirements. Internal service providers include ICTS, UNOG and UNICC with external service providers being Savvis and iWay.

## 5.2 Option 1: Internal Service Provider ICTS, UNOG

Option 1 would be to host the DETA application at ICTS, UNOG. Some departments at UNOG, i.e. Conference Services and UNOG Security, use Oracle as the database server. UNECE contacted these Organizations to evaluate their model as a baseline for UNECE's estimations for the DETA Application's deployment at ICTS, UNOG.

### 5.2.1 ICTS, UNOG

ICTS, UNOG provides shared Oracle Server Enterprise Edition. The table below shows various elements of ICTS, UNOG proposal. The total for initial investment will be USD 215'647 and recurring cost in the following years will be USD 153'195.-

#### Initial Cost (First Year)

Licence Type	Processor	Quantity	Licence Price	Support	Total
Oracle Database Enterprise Edition Share Acquisition	Xeon	2	\$ 22'750	\$ 5'005	\$ 47'500
Oracle DB Set up					\$ 2'795
Suse 11 OS install					\$ 1'500
Application Server JBoss 4.2	Xeon	2	\$ 0	\$ 0	\$ 3,046
Database Server vm instance					\$ 5,072
Hardware		1			\$ 11'660
Replica Copy (Mirror)		200 GB			\$ 8'777
Backup on SAN					\$ 9'188
20 % contingency budget					\$ 23'441
Staff salary P2 Level 50%					\$ 75'000
				Grand Total	\$ 215'647

#### Recurring Cost

Licence Type	Processor	Quantity	Licence Price	Support	Total
Oracle Database Enterprise Edition Share	Xeon	2	\$ 22'750	\$ 5'005	\$ 27'182
Application Server JBoss 4.2	Xeon	2	\$ 0	\$ 0	\$ 3,046
Database Server vm instance		1			\$ 5,072
Hardware					\$ 11'660
Replica Copy (Mirror)		200 GB			\$ 8'777
Backup on SAN					\$ 9'188
20 % contingency budget					\$ 13'033
Staff salary P2 Level 50%					\$ 75'000
				Grand Total	\$ 153'195

ICTS, UNOG will create a virtual machine instance per oracle db instance requested by UNECE. ICTS, UNOG will also allocate the appropriate amount of storage and assign it to the virtual machine instances.

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The servers environment is linked to the ICTS, UNOG SAN which connects to EMC Symmetrix high speed mirrored storage.

The ICTS, UNOG proposal includes the provision of a second instance of the database. This second instance would be a replica and stand-by copy, which could be activated manually in the event of the primary instance being unavailable.

### **5.2.2 Database Server Environment**

The proposed database technical architecture is based on the existing Oracle Enterprise DB Server environment in ICTS, UNOG.

ICTS, UNOG will create a virtual machine instance per oracle db instance requested by UNECE. ICTS, UNOG will also allocate the appropriate amount of storage and assign it to the virtual machine instances.

There will a replica copy of the vmware instance and the system will be connected to the SAN data storage system. See the appendix 2.

### **5.2.3 Application Server (Middleware) Environment**

ICTS, UNOG will provide vmware instance. The characteristics of this instance are:

- Pre-packaged machines. SuSE Enterprise 11 operating system will be installed on the virtual machine.
- High availability and load balancing at the physical level ICTS, UNOG will provide a virtual machine to host the applications.
- The machine will be delivered with 2 CPU and 4GB of RAM.
- ICTS will also provide 100GB on EMC Symmetrix high speed mirrored storage connected to the virtual machine.

### **5.2.4 UNOG Bandwidth**

The required bandwidth for the DETA application is 4 Mbps. UNOG-ICTS provides 2 types of connections: one 20 Mbps and the second 32 Mbps bandwidth. This would be sufficient for the application

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## **5.3 Option 2: Internal Service Provider ICTS, UNOG and UNECE**

### **5.3.1 Available UNECE Infrastructure (UNECE Private VMWare Servers)**

UNECE has private VMWare infrastructure. There are 2 VMWare servers located in the DMZ. This setup will allow us to create a 2tier architecture.

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For the application server there can be 2 VMWare instances (ece-vmdata and its replica copy). This VMWare instance would be secured there is a passive replica copy on VMWare server in order to ensure uninterrupted availability.

The servers environment is linked to the ICTS SAN fabric which connects to EMC Symmetrix high speed mirrored storage. See Appendix 3.

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## 6.0 UNECE Proposal

UNECE proposes to deploy the DETA application at its private VMWare servers hosted by ICTS, UNOG. Technical architecture is similar to ICTS, UNOG. However the DETA application will take advantage UNECE's infrastructure and service provided by ISU UNECE such as installation and administration of the servers. On the other hand in for the confidentiality the data will be accessible and be managed by UNECE staff.

The reasons for deploying the application at UNECE private vmware platform are the followings:

1. Confidentiality: One of the main request for DETA application is the confidentiality of the data. By using UNECE private VMWare system at ICTS, UNOG UNECE will have full control on data confidentiality. This is not the case with external service provider. Although the risk is low confidential data may be accessed or copied by third parties.
2. SAN (Storage Area Network): Improved security and uninterrupted availability by replica copies and backup by SAN. Both application and database servers will be cloned by replica copies on a second VMWare server. In case a hardware problem these replica copies can be activated immediately. On the other hand the servers will be backed in the SAN system at ICTS, UNOG which can retrieved in one hour. This set-up will provide high availability requested by business owners of the DETA application.
3. 24/7 service: Currently there is no 24/7 but ICTS, UNOG plan to provide 24/7 within one year.
4. Taking advantage of the infrastructure and services: UNECE already set up the its private vmware system. There will be cost savings from installation, administration of the DETA system.

Deploying DETA application on a VMWare platform instead of dedicated machines would have the following advantages:

- Business Continuity processes are transparent. e.g. no need to stop the machine for the upgrades
- Reboot is 10 to 15 times faster than on a dedicated server
- Confidentiality is guaranteed as the physical server layer can not access the storage this can only be done by the virtual machine.
- I/O processes are exactly the same as on a dedicated server
- The cost of the physical server is shared thus making better use of resources.

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For information Oracle is actively marketing a virtualization solution for their products, thus any concerns in that area may have been superseded by the general evolution of technology in these areas.

A new virtual machine to host DETA database server will be added to the UNECE VMWare system in LAN. The HP DL380 server will be same as the other machine in the UNECE VMWare system in order to facilitate administration and management of the system :

Server: HP DL380 ProLiant  
HD : 1TB  
RAM: 24 GB  
RAID . 1  
Cost: USD 30'578

A new VMWare instance with 500 GB HD and 6 GB RAM will be created on the new virtual server. . Besides additional space will have to be allocated on SAN. The allocated data storage will be initially 100 GB additional space will be added up to 1 TB SAN with a yearly \$ 14'000 cost in order to obtain high availability.

To avoid unexpected increase in project budget, we request 20% extra budget for the project.

Internet connection speed: Minimum required internet connection speed is 4 Mbps. UNOG provides 2 connections: 20 Mbps and 32 Mbps

## **6.1 Oracle Database Server Environment**

Although Enterprise version has all features and tools that Oracle offering such as clustering and monitoring tools Oracle Standard Edition has all necessary features and functionalities in order to host the DETA application by UNECE.

Storage requirement for the system : The assumption is in total 100 GB for the storage of new documents in a year. 500 GB HD storage will be allocated to cover 5 years of period.

## **6.2 Application Server Environment (Middleware server)**

DETA application supports Jboss 4.2. Currently UNECE has a Jboss application server which is used by IAN ([www.unece.org:8080/ian](http://www.unece.org:8080/ian)) and TIR applications. It is an open source application server. There is a VMWare instance available on UNECE's VMWare server hosted at UNOG. This server is backed up by another server to ensure high availability (24/7).

The application server will be Jboss 4.2 platform running on OS Linux Suse 11. It is an open source middleware application server.

Main features in Jboss 4.2 include:

- Tomcat 6.0 which adds support for JSP 2.1 and Servlet 2.5
- Java Server Faces 1.2 integration

- Support for Hibernate 3.2.3
- Enterprise JavaBeans (EJB) 3.0 implementation

A new VMWare instance will be added to the UNECE VMWare server at DMZ with 100 GB HD and 4 GB RAM. This server will be connected to the SAN and there will be a copy in the second server in order to secure uninterrupted service.

We can summarize the advantages for selecting JBoss 4.2 open source middleware platform as follows:

1. Compatible with the DETA application.
2. Infrastructure already in place.
3. Acquired know-how by UNECE staff. UNECE implemented JBoss server for more than 5 years.
4. Cost: Jboss is Open source no license required to install it and it is easy to maintain and administer.
5. It is widely used java EE, Enterprise Edition, application server on the market supported by a large user community

### 6.3 Extra-budgetary Staff to manage the DETA system

Extra-budgetary staff required to manage/administer DETA:

Oracle Database Administrator (DBA):

Oracle DBA's responsibilities cover technical administration DETA system. His/her role covers administration of database and application servers as well as management of groups and end-users. Estimated time for DBA role is 50% staff time at P2 level.

The proposed infrastructure for the DETA application will be in UNECE private VMWare system. For this reason ISU will be involved in technical administration of the application such as administration and maintenance of Linux, application and Oracle servers. The DETA technical staff will work closely and report to ISU.

### 6.4 Database and Application Servers Specifications

Server Type	OS	Processor	Quantity	RAM	Hard Disk
Application Server JBoss 4.2	Linux Suse 11	Xeon	2	4	100 GB
Database Server	Linux Suse 11	Xeon	2	6	500 GB

### 6.5 Initial investment

Licence Type	Processor	Quantity	Licence Price	Support	Total
Oracle Database Standard Edition	Xeon	2	\$ 22'750	\$ 5'005	\$ 27'755
Oracle DB Set up					\$ 0
Suse 11 OS install					\$ 0
Application Server JBoss 4.2	Xeon	2	\$ 0	\$ 0	\$ 0
Database Server vm instance					\$ 0
Hard Ware (HP DL380)		1			\$ 30'578
Replica Copy		200 GB			\$ 0
Backup on SAN					\$ 2'800
20 % contingency budget					\$12'227
Staff salary P2 Level 50%					\$ 75'000
				Grand Total	\$ 148'360

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## 6.6 Annual recurring costs

Buying HP DL380 server will be one time investment. The rest of items are recurring costs which will be paid every year. Among these expenses there is Oracle Standard Edition license, Oracle support, Storage Area Network allocated for DETA and one IT staff. SAN will initially be 100 GB but it will increase by 100 GB by year.

Licence Type	Processor	Quantity	Licence Price	Support	Total
Oracle Database Standard Edition	Xeon	2	\$ 22'750	\$ 5'005	\$ 27'755
Application Server JBoss 4.2	Xeon	2	\$ 0	\$ 0	\$ 0
Database Server vm instance					\$ 0
Replica Copy		100 GB			\$ 0
Backup on SAN					\$ 2'800
20 % contingency budget					\$ 6'111
Staff Salary P2 level					\$ 75'000
				Grand Total	\$ 111'666

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## Appendix 1

### ORACLE OFFER

UNOG Procurement has received offer from ORACLE. The offer includes Oracle Enterprise Edition and Standard Editions as well as application server (J2EE).

1. Option: This option includes Oracle Standard Edition and GlassFish Server (J2EE).

Licence Type	Processor	Quantity	Licence Price	Support	Total
Oracle Database Standard Edition	Xeon	2	\$ 22'750	\$ 5'005	27'755
Oracle GlassFish Server	Xeon	4	\$ 13'000	\$ 2'860	15'860
				Grand Total	43'615

2. Option: This is the current deployed configuration at KBA. Enterprise edition has some additional functionalities such as clustering etc.

Licence Type	Processor	Quantity	Licence Price	Support	Total
Oracle Database Enterprise Edition	Xeon	2	\$ 95'000	\$ 20.900	125.900
Diagnostic Pack	Xeon	4			
Oracle GlassFish Server	Xeon	4	\$ 10'000	\$ 2'200	12'200
				Grand Total	138'100

3. Option: This option includes Oracle Standard Edition and Jboss 4.2. Standard edition has all functionalities to run the application.

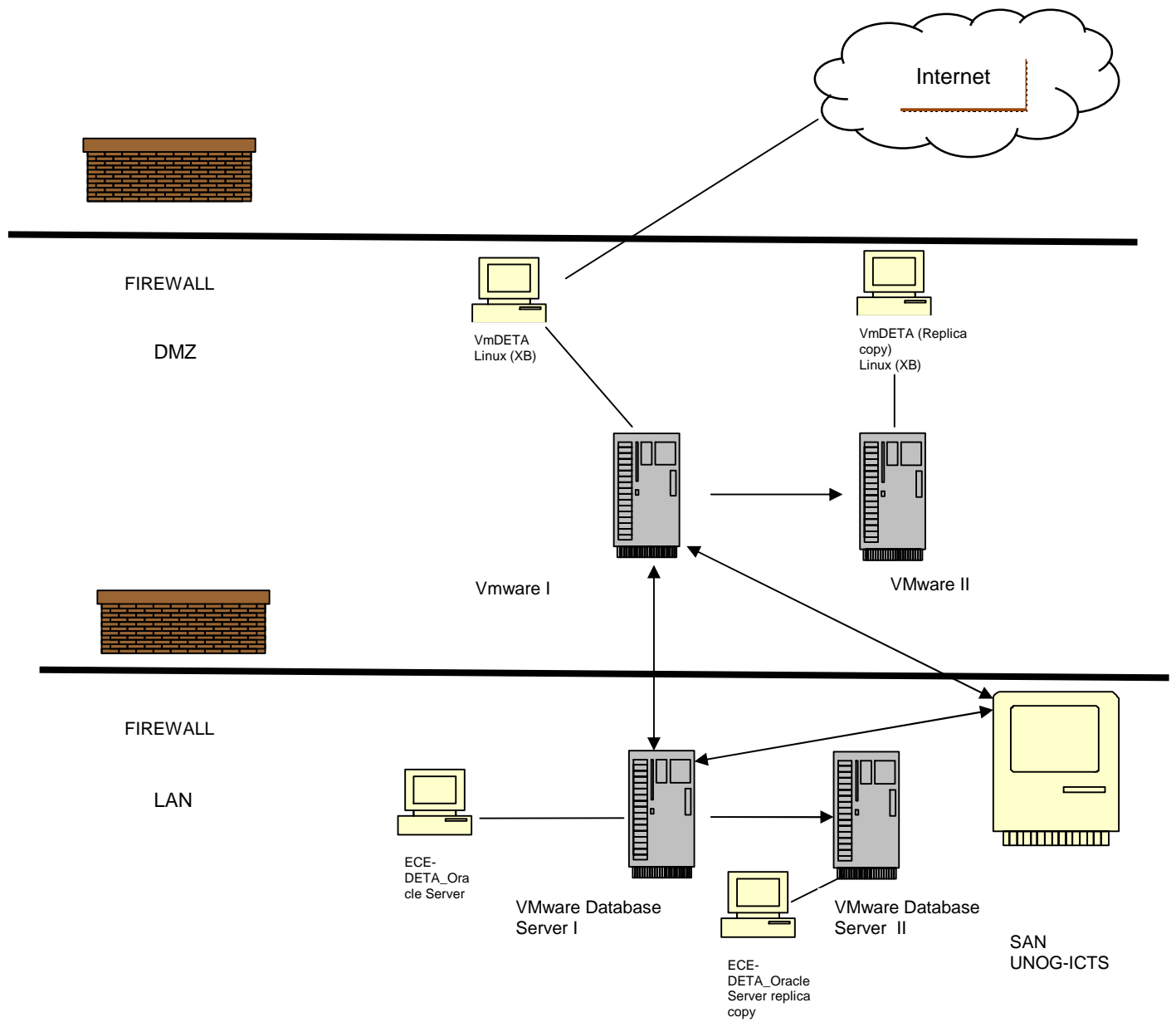
Licence Type	Processor	Quantity	Licence Price	Support	Total
Oracle Database Standard Edition	Xeon	2	\$ 22'750	\$ 5'005	27'755
Jboss 4.2 Application Server	Xeon	4	0	0	0
				Grand Total	27'755

4. Option: This options shows deployment cost of the DETA application on the Oracle Enterprise Edition and Jboss 4.2 middleware server.

Licence Type	Processor	Quantity	Licence Price	Support	Total
Oracle Database Enterprise Edition	Xeon	2	\$ 95'000	\$ 20.900	125.900
Diagnostic Pack	Xeon	4	0	0	0
JBoss Application Server 4.2	Xeon	4	0	0	0
				Grand Total	125'900

## Appendix 2

### ICTS, UNOG DETA Application Architecture





### Appendix 3

## Unece DETA Application Architecture

