COMPANIES REGISTRY

Third Party Software Interface Specification

(Part 1 – Overview)

of

Integrated Companies Registry Information System

Version 1.4
June 2016
## Amendment History

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<tr>
<th>Date</th>
<th>Version</th>
<th>Description</th>
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<tr>
<td>Sep 2010</td>
<td>1.0</td>
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<td>Update the diagram in 2.1.2.2</td>
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<td>and 2.2.1.2</td>
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<td>Update e-form name in 2.3.1</td>
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Terms and Abbreviations

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<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>Applet</td>
<td>A program module written in the Java programming language that runs under the control of an internet browser.</td>
</tr>
<tr>
<td>e-Registry Company User Account</td>
<td>An account registered by a company or business at the e-Registry portal.</td>
</tr>
<tr>
<td>e-Registry Individual User Account</td>
<td>An account registered by an individual at the e-Registry portal.</td>
</tr>
<tr>
<td>e-Registry User</td>
<td>Any user which has registered either a Company User Account or an Individual User Account at the e-Registry portal.</td>
</tr>
<tr>
<td>CR</td>
<td>Companies Registry</td>
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<tr>
<td>Developer</td>
<td>A party or a person who develops applications or systems to generate e-Forms according to the ICRIS TPSI Specification.</td>
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<tr>
<td>e-Cert</td>
<td>A Digital Certificate in X.509 format issued by either the Hongkong Post (i.e., Hongkong Post e-Cert) or the Digi-Sign Certification Services Limited (i.e., Digi-Sign ID-Cert).</td>
</tr>
<tr>
<td>e-Form</td>
<td>A specified form of the CR in electronic format generated using the Versitech e-Form solution.</td>
</tr>
<tr>
<td>e-Form Filler</td>
<td>A Java Application of the Versitech e-Form solution running on the client machine, which provides a graphical user interface for external users to fill in an e-Form.</td>
</tr>
<tr>
<td>e-Form Processor</td>
<td>A component of the Versitech e-Form solution for processing e-Forms, including the process to render an e-Form template with the required business data of the subject company retrieved from the external user’s own information system.</td>
</tr>
<tr>
<td>e-Form Template</td>
<td>A blank e-Form which external users will render with the required business data of the subject company retrieved from their own information system using the e-Form Processor.</td>
</tr>
<tr>
<td>e-Registry</td>
<td>Name of the ICRIS portal of the CR.</td>
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<tr>
<td>ICRIS</td>
<td>Integrated Companies Registry Information System</td>
</tr>
<tr>
<td>Java</td>
<td>A popular object-oriented computer programming language that is widely used from application software to web applications.</td>
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<tr>
<td>JDK</td>
<td>Java Development Kit</td>
</tr>
<tr>
<td>JRE</td>
<td>Java Runtime Environment</td>
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<tr>
<td>Signatory</td>
<td>A person who is authorised to electronically sign an e-Form by either e-Cert or password registered with the e-Registry.</td>
</tr>
<tr>
<td>Third Party Software Interface (“TPSI”)</td>
<td>An e-Registry function that provides an interface for e-Registry Users to register/de-register as TPSI User and other related functions for submitting e-Forms generated by third party software in the specified data formats with or without attachments to the CR.</td>
</tr>
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### Terms and Abbreviations

<table>
<thead>
<tr>
<th>Term / Abbreviation</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>TPSI User</td>
<td>An e-Registry User who has registered to use Third Party Software Interface function.</td>
</tr>
<tr>
<td>Versitech SDK</td>
<td>The Software Development Kit of Versitech e-Form Processor</td>
</tr>
<tr>
<td>XML</td>
<td>Extensible Mark-up Language. It is a set of rules for encoding documents in machine-readable form.</td>
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1. GENERAL INFORMATION

1.1 INTRODUCTION

1.1.1 Objective

The TPSI Specification for the ICRIS for the CR outlines the processes and procedures for TPSI Users to generate specified forms of the CR in e-Forms by third party software and then submit the completed and signed e-Forms to the CR through the TPSI function of the CR’s e-Registry. The TPSI Specification also details the data specifications of individual e-Forms of the CR.

The TPSI Specification consists of three parts, namely:

**Part 1 – Overview**

It gives an overview of the processes for TPSI Users to generate e-Forms by third party software and then submit the completed and signed e-Forms to the CR through the TPSI function of e-Registry, including administration and operating procedures for interfacing with e-Registry.

**Part 2 – Versitech e-Form Data Specification**

It provides a detailed account of the data requirements for e-Forms that are to be generated using Versitech e-Form Processor. Please refer to ICRIS Third Party Software Interface Specification (Part 2 - Versitech e-Form Data) for details.

**Part 3 – ICRIS XML Data Specification**

It sets out a detailed account of the data requirements for XML data files that are to be generated for submitting to the CR through the TPSI function of e-Registry. Please refer to ICRIS Third Party Software Interface Specification (Part 3 - ICRIS XML Data) for details.

The data specifications provided in Parts 2 and 3 of the TPSI Specification aim to enable TPSI Users to exchange with the CR through e-Registry the required business data of the subject company in a standardised interface file format and structure using XML technologies.

1.1.2 Target Readers of the TPSI Specification

**Part 1 – Overview**

This part is intended for TPSI Users and Developers. It presents an overview of the process of submission of e-Forms generated by third party software to the CR using the TPSI function of e-Registry.
Part 2 – Versitech e-Form Data Specification
This part is for Developers. It gives an outline on using Versitech e-Form Processor to directly generate e-Forms.

Part 3 – ICRIS XML Data Specification
This part is for Developers. It gives an outline on using the facilities provided by the CR to generate e-Forms from XML data files.

1.2 ASSUMPTIONS AND LIMITATIONS

1) All the e-Forms defined in this TPSI Specification must be compatible with Versitech e-Form Processor version 3.0.
2) e-Forms and XML data files generated for submission to the CR must comply with the data specifications detailed respectively in Part 2 (for Versitech e-Form data) and Part 3 (for ICRIS XML data) of the TPSI Specification.

1.3 REGISTER TO USE THE TPSI FUNCTION OF E-REGISTRY
An e-Registry User who wants to submit e-Forms to the CR through the TPSI function of e-Registry can either customise/develop its own or purchase from a vendor an application or a system for the generation of e-Forms.

1.3.1 Prerequisite
A TPSI User should have registered as an e-Registry User before it can register to use the TPSI function.

1.3.2 Online Registration to use the TPSI Function
An e-Registry User can login to the e-Registry portal and register to use the TPSI function by using the function “Register to user TPSI”. After completing the registration, the TPSI User can get access to the TPSI function of e-Registry. The Registrar of Companies reserves the right and discretion to revoke the permission granted to any TPSI User for using the TPSI function.

The TPSI User can opt to withdraw from using the TPSI function at any time by using the function “De-register to user TPSI”.

2. **E-FORM GENERATION AND SUBMISSION**

2.1 **HIGH-LEVEL WORK FLOW**

The TPSI function provides an interface for TPSI Users to submit to the CR their e-Forms generated by third party software, in the prevailing standard interface file formats with or without attachments.

After successfully registered to use the TPSI function, the TPSI User will be able to access the function menu for submission of e-Forms in bulk or individually through the TPSI function. The TPSI User will also be able to download the latest e-Form templates available in e-Registry.

(1) **Generate e-Forms by Third Party Software**

To generate e-Forms complying with the standard interface file format of ICRIS, a TPSI user will have to adopt the approach set out below:

- **Section 2.2** to acquire Versitech e-Form Processor from a vendor to fill the required business data of the subject company into the e-Form templates; or
- **Section 2.3** to use ICRIS to generate e-Forms from XML data files of the subject company.

A brief account of these two approaches is provided in **Sections 2.1.1** and **2.1.2** respectively.

A TPSI User will have to download an e-Form template from e-Registry and fill out the e-Form with the required business data of the subject company using the Versitech e-Form Processor. The TPSI User can use this e-Form template for subsequent generation of e-Forms unless a revised/new version of this e-Form template is available for download at e-Registry. The e-Form templates can also be used by Developers to customise or develop e-Form generation systems. TPSI Users or Developers can use the Versitech e-Form Filler to open the e-Form templates and view the data fields required in the e-Forms.

TPSI Users are advised to perform the following internal checking before submitting e-Forms generated by third party software to the CR:

- Use Versitech e-Form Filler to check the generated e-Forms that the required business data of the subject company are correctly filled.
- Validate individual data items in the generated e-Forms according to the data specifications as provided in **Parts 2** or **3** of this TPSI Specification.

Before using the TPSI function to generate and submit e-Forms, TPSI Users and their Developers must take all necessary actions to test and ensure that their applications and e-Forms are error free and are compatible with the interface file format. The CR will provide a testing environment for TPSI Users and Developers to perform all the necessary tests. TPSI Users and Developers can test the compatibility of their e-Forms...
so generated with the standard interface file format of ICRIS. The e-Forms submitted by a TPSI User and Developer to the testing environment are for testing purpose only and will only be validated as to the correctness of data format of the filled-in business data. No validation on the content of the business data so submitted will be performed. There will also be no approval or any such kind of endorsement by the CR of the e-Forms submitted by a TPSI User and Developer for passing the validation process of the testing environment. At the registration to use the TPSI functions, the e-Registry User is required to confirm that all the necessary tests have been or will be performed to ensure that the software he used is compatible with the TPSI Specification.

Detailed arrangements for the testing environment will be announced by the CR in due course.

(2) Submit e-Forms to the CR through e-Registry

After a generated e-Form is signed by the Signatory(ies), the TPSI User can submit it to the CR through the TPSI function for further processing.

2.1.1 Versitech e-Form Processor Solution

2.1.1.1 High-Level Process Flow

Versitech e-Form Processor is a Java-based component of the Versitech e-Form solution that can be acquired from the relevant vendor. By using the Versitech Java API provided with the Versitech e-Form Processor, a TPSI User or Developer can integrate the Versitech e-Form Processor with its application or system such that the required business data of the subject company can be extracted directly from its information system to fill in an e-Form template (i.e. a blank e-Form). As regards the support and licensing matters of Versitech e-Form Processor, please refer to Section 2.2.4 for the contact information of the vendor.

After an e-Form is filled with the required business data of the subject company, the e-Form can be electronically signed by the Signatory(ies) using the Versitech e-Form Filler, or have the electronic signatures of the Signatory(ies) embedded directly on it using the Versitech Java API.

The following diagram illustrates the workflow process:
(1) Download e-Form Templates

A TPSI User or Developer can download the e-Form templates from e-Registry. Once a TPSI User or Developer has downloaded a particular e-Form template for generation of an e-Form, that e-Form template can be used for subsequent generation of the e-Form unless there is a revised/new version available in e-Registry.

(2) Fill in an e-Form Template with Data using Versitech Java API

A TPSI User or Developer can use the Versitech Java API to integrate the Versitech e-Form Processor with its application or system to generate e-Forms. A brief description on how to fill in an e-Form template with the required business data of the subject company is provided in Section 2.2.

(3) Sign an e-Form

The e-Forms so generated need to be electronically signed by the Signatory(ies) before submitting to the CR. Electronic signing can be done by using:

- Versitech e-Form Processor - An e-Registry User can use the Versitech Java API to integrate its own signing interfaces with the Versitech e-Form Processor.
- Versitech e-Form Filler, which can be downloaded from e-Registry.

(4) Submit Signed e-Form to the CR through e-Registry

TPSI Users are required to use the TPSI function to submit the electronically signed e-Forms to the CR for further processing. For first submission, TPSI signed e-Form can be submitted following the procedures below:
ICRIS Third Party Software Interface Specification

Part 1 – Overview

e-Form Generation and Submission

a. Click “Third Party Software Interface (TPSI)” after login

b. Click “Upload TPSI e-Form” to proceed
c. Click “Browse” button to select e-form(s), then select “Upload” button to proceed
(5) **Re-submit Signed e-Form to the CR through e-Registry**

TPSI Users can open rejected e-form(s) in e-Form Filler and amend the TPSI e-form data. Amended e-forms previously submitted via TPSI channel should be re-submitted through the online or offline submission channels only. However, if alteration to TPSI e-form data is not allowed, TPSI Users should amend the source data and regenerate the e-form for re-submission.

(I) Re-submission through online submission can follow the procedures below:

a. Search the rejected document in e-Registry under “e-Submission Services > Document Status Enquiry”, choose “Edit Online” to retrieve and open the e-form online.

**Document Status Enquiry**

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</thead>
<tbody>
<tr>
<td>170006608</td>
<td>0368597</td>
<td>WELCOME DEVELOPMENT LIMITED</td>
<td>02-Dec-2013</td>
<td>T3102057666</td>
<td>(E)FNNC2 - Notice of Change of Company Name</td>
<td>Pending re-lodged</td>
<td>Edit Online, Re-submit Original, Form without Changes</td>
</tr>
</tbody>
</table>

(Note: This function shows only pending electronic documents submitted by you which require registration.)
b. Correct the e-form data and submit again
(II) Re-submission through offline submission can follow the procedures below:

a. Search the rejected document in e-Registry under “e-Submission Services > Document Status Enquiry”, choose “Edit Offline” to save the e-form to local PC.

**Document Status Enquiry**

- Company No.: [ ]
- Submission Date: [From] [To]
- Document Ref No.: [ ]
- Case No.: [170096608]

(Note: This function shows only pending electronic documents submitted by you which require registration.)

b. Open the downloaded e-form by e-Form Filler, correct the e-form data and save the amended e-form.
c. Click “Offline Submission” after login

d. Click “Browse” button to select e-form(s), then select “Submit” button to proceed
Note: Please note that the “Submission” button or the function “Tools > Submit e-Form” in e-Form Filler is designed for submission of online e-forms only, i.e. e-form(s) generated through the Guided Wizard at the e-Registry with company data pre-filled by the system. TPSI Users may experience unexpected behaviour or system error if they try to submit TPSI generated e-form(s) through e-Form Filler. Please make sure steps (4) or (5) above are followed for submitting TPSI generated e-forms.
2.1.1.2 Detailed Workflow on e-Form Submission with Versitech e-Form Processor

The following workflow scenario illustrates the process for a TPSI User to submit e-Forms generated by third party software through the TPSI function.
1. TPSI User downloads e-Form templates from e-Registry when necessary.
2. TPSI User uses its own e-Form generation system to create e-Forms.
3. TPSI User delivers the e-Forms so generated to the Signatory(ies) for signing. The Signatory(ies) sign the e-Forms by using the Versitech e-Form Filler or application with Versitech e-Form Processor Integrated (Versitech Java API) in the correct sequence.
4. Signed e-Forms are returned to the TPSI User.
5. TPSI User submits the signed e-Forms to the CR using the TPSI function.

2.1.2 XML Data File Solution

2.1.2.1 High-Level Process Flow

A TPSI User can upload the XML data files containing business data to the CR for generation of e-Forms. When adopting this approach, a TPSI User does not need to acquire the Versitech e-Form Processor. The related process workflow is illustrated in the following diagram:
(1) Generate XML Data File

This is another means for a TPSI User to generate e-Forms. Under this option, the TPSI User will not be required to acquire the Versitech e-Form Processor. The CR has published the specifications of the XML data files format with schema definition in Part 3. The TPSI User can generate the XML data files in accordance with the data file specifications. The XML data files so generated can then be uploaded to the CR through the TPSI function for generation of the e-Forms by ICRIS.

(2) Upload XML Data File to e-Registry

A TPSI User can upload its XML data file so generated to the CR through the TPSI function of e-Registry. Once the XML data file has been successfully uploaded to the CR, the TPSI User will be informed that the XML data file is queuing up for processing.

(3) Generate e-Form from the XML Data File

The uploaded XML data file will be processed by ICRIS to produce the corresponding e-Form. During the e-Form generation process, only format transformation but not validation of the data contents provided in the XML data file will be done. The validation of data contents will only be performed when the TPSI User subsequently submits the signed e-Form so generated to the CR through the TPSI function of e-Registry.

(4) Send Download Link to the TPSI User to retrieve the e-Form

The TPSI User will receive notification through e-Registry after the e-Form is successfully generated. The notification message will include a download link for the TPSI User to retrieve the e-Form so generated.

(5) Sign the e-Form by Versitech e-Form Filler

The TPSI User can then pass the e-Form so generated to the Signatory(ies) who can use the Versitech e-Form Filler (which can be freely downloaded from e-Registry) to sign and/or update the e-Form.

(6) Submit the Signed e-Form to e-Registry

After all the Signatory(ies) have signed the e-Forms (with signing of each section by individual Signatory(ies) done first, and Form Signing done last), the TPSI User can submit the e-Form so signed to the CR through the TPSI function of e-Registry. The TPSI User will then be notified whether the e-Form is successfully submitted for processing by both e-mail and the messaging system of e-Registry. The e-Form so successfully submitted will be queued up for processing.
### 2.1.2.2 Detailed Workflow on e-Form Submission with e-Registry

The following workflow scenario illustrates the process for a TPSI User to generate e-Forms from XML data files by ICRIS.

1. TPSI User generates the XML data files.
2. TPSI User uses the TPSI function to upload the XML data files to the CR for e-Forms generation.
3. The XML data files are queued up in ICRIS for converting into e-Forms.
4. The CR sends notification to the TPSI User after successfully generated the e-Forms. A download link is provided in the notification for the TPSI User to retrieve the e-Forms so generated.
5. TPSI User delivers the e-Forms so generated to the Signatory(ies) for signing. The Signatory(ies) sign the e-Forms by using the Versitech e-Form Filler.
6. Signed e-Forms are returned to the TPSI User.
7. TPSI User submits the signed e-Forms to the CR using the TPSI function.

2.2 E-FORM GENERATION BY VERSITECH E-FORM PROCESSOR

2.2.1 System Requirements

The CR has adopted the Versitech e-Form solution. TPSI Users or their Developers can use components of the Versitech e-Form solution to generate e-Forms for submission to the CR.

The Versitech e-Form Filler and the Versitech e-Form Processor are the two components of the Versitech e-Form solution for preparing e-Forms.

2.2.1.1 Versitech e-Form Filler

The Versitech e-Form Filler can be freely downloaded from e-Registry. It is primarily used for viewing/editing e-Forms and is also used for filling in e-Forms.

The hardware and software requirements of the Versitech e-Form Filler are provided in the vendor’s website (see Section 2.2.4). Below is a summary of the details. Please always refer to the vendor’s website for the most up-to-date information.

Hardware Requirements

The minimum hardware requirements for the Versitech e-Form Filler are:
1) Intel Atom/Celeron Processor
2) 512 MB Main Memory

For better performance, the recommended configurations for the Versitech e-Form Filler are:
1) Intel Core i3 or higher
2) 2GB Main Memory or more

Software Requirements

The Versitech e-Form Filler has been tested on the following operating systems:
2) Fedora Linux Core 16 or above
3) Apple Mac OS X 10.8.3 or above

Additionally, the Versitech e-Form Filler requires Java SE Runtime Environment (JRE) 7.
2.2.1.2 Versitech e-Form Processor

Versitech e-Form Processor is the software tool for filling in e-Form templates with the required business data of the subject company. A TPSI User can make use of the Versitech Java API (which is provided with the Versitech e-Form Processor) to integrate the Versitech e-Form Processor with its information system. The Versitech e-Form Processor is required to be run in a Java J2EE environment. As regards the support and licensing matters of Versitech e-Form Processor, please refer to Section 2.2.4 for the contact information of the vendor.

The hardware and software requirements of the Versitech e-Form Processor are provided in the vendor’s website (see Section 2.2.4). Below is a summary of the details. Please always refer to the vendor’s website for the most up-to-date information.

Hardware Requirements

The server hardware should be capable of running J2EE Application Server. Faster hardware will produce better results. The hardware requirements of the Versitech e-Form Processor are thus also dependent on those for the J2EE Application Server to be used.

Software Requirements

The following software components are required:

1) Java SE JDK 7
2) J2EE compliant application server, such as Apache Tomcat

2.2.2 e-Form Templates

An e-Form template is a blank e-Form. The following are the differences between an e-Form template and an e-Form:

1) Data fields on an e-Form template are all empty while an e-Form is pre-filled with the required business data of the subject company.

2) There are hidden fields on an e-Form template specifying that it can be used to generate an e-Form by a third party software. Additional validation checking will be performed by ICRIS on the data provided in the e-Form so generated during the submission process.
2.2.3 Components of Versitech e-Form Processor

The following components are included in the Versitech e-Form Processor Distribution Package to be acquired from the vendor:

1) Versitech e-Form Processor 3.1
2) Jakarta Tomcat application server 5.5.9
3) Jakarta Ant build tool 1.6.5
4) JEdit 4.0.3 – This is an open source text editor that supports a number of character encodings including UTF-8. It can be used to edit the configuration files of Versitech e-Form Processor.
5) e-Form Processor Handbook – It contains useful information about the configuration, system integration and deployment of the component.
6) JavaDoc API document – It contains useful reference information for the programming work of Developers.

The vendor may from time to time change the components of the Versitech e-Form Processor Distribution Package mentioned above. Please always refer to the vendor for the most up-to-date information.

- `hk.hku.versitech.eform.pub.EformWrapper` is the Java class for handling e-Forms and is primarily used for generating e-Forms.

- The `EformWrapper()` constructor can be used to read in an e-Form template and create an `EformWrapper` instance representing the form object.

- The `EformWrapper.setValue(String id, Object value)` method is used for assigning data to field elements in an e-Form template with the corresponding `id`. Data field specifications of e-Forms are provided in Part 2. The relevant business data of the subject company can be retrieved from the internal database of a TPSI User and put into the `EformWrapper` object.

- The `EformWrapper.signSection()` method can be used to electronically sign the completed e-Forms.

2.2.4 Contact Information of Versitech Products

TPSI Users or Developers who are interested in or want to acquire the Versitech products can contact the vendor directly for any support and licensing issues. The homepage of Versitech Limited is `http://www.versitech.hku.hk/`. 
2.3 XML DATA FILE SOLUTION

2.3.1 XML Data File Generation

ICRIS will generate e-Forms from XML data files uploaded by TPSI Users. TPSI Users are required to submit to the CR their XML data files prepared in the pre-defined data formats that are designed using XML Schema. The XML schema definition file is provided in Part 3.

Each field in an e-Form has been assigned a unique field label, e.g. “S1compNameE” for the “Intended English Company Name” field of the NNC1 e-Form. The field label is also used in the XML data file for specifying the data value to be filled in.

The script below illustrates the case of “S1compNameE” on the NNC1 e-Form:

```xml
<Eform xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:noNamespaceSchemaLocation="CR-Format.xsd"
    id="NNC1_1">
    <TextField id="S1compNameE">ABC Trading Limited</TextField>
    ...
</Eform>
```

For the generation of XML data files, the first level is the Eform tag with the id field indicating the e-Form being filled in with data. The second level is value tag with the id field indicating the field label of the e-Form. The specification of XML data file is provided in Part 3.

2.3.2 XML Data Types

A field in an e-Form can be one of the following four field types:

a) TextField  
b) TableField  
c) ArrayField  
d) RadioField

Data stored as “TextField”, “TableField” or “ArrayField” should be in Unicode String format and UTF-8 encoding.

For “RadioField”, the data value to be stored is an integer indicating the corresponding data item selected in the e-Form. The sequence of the data items in the e-Form is from left to right and top to bottom starting from “1.”
Data types on the e-Form are mapped to data types on the XML data file as follows:

<table>
<thead>
<tr>
<th>e-Form Data Type</th>
<th>XML Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop Down List</td>
<td>TextField</td>
</tr>
<tr>
<td>Text</td>
<td>TextField</td>
</tr>
<tr>
<td>Text Area</td>
<td>TextField</td>
</tr>
<tr>
<td>Signature</td>
<td>N/A</td>
</tr>
<tr>
<td>Checkbox</td>
<td>TextField. Value is either “true” or “false”</td>
</tr>
<tr>
<td>Attachment</td>
<td>N/A</td>
</tr>
<tr>
<td>Button</td>
<td>N/A</td>
</tr>
<tr>
<td>Strike-Out</td>
<td>N/A</td>
</tr>
<tr>
<td>Radio Button</td>
<td>RadioField</td>
</tr>
<tr>
<td>Table</td>
<td>TableField</td>
</tr>
</tbody>
</table>

### 2.3.3 Attachment Files

Attachment files are documents prepared and submitted by TPSI Users to the CR together with an e-Form. Since the file size of an attachment file could be very large, ICRIS does not support direct generation of e-Forms from XML data files that have attachment files. TPSI Users are therefore required to attach any necessary documents to an e-Form after the e-Form is generated from the XML data file.

*** End of Document ***