

RHEA Requirements - Terminology Service

<u>Name</u>	Apelon DTS
<u>URL</u>	http://www.apelon.com/
<u>Description</u>	<p>Apelon DTS (Distributed Terminology System) is developed and supported by Apelon Inc. and consists of the following components:</p> <ul style="list-style-type: none">• A core server• DTS Editor, a standalone application for managing the terminologies on the server• DTS Browser, a web-based front-end for viewing terminology trees• Import/Migration utilities
<u>Licensing</u>	Open Source (Apache License, Version 2.0)
<u>Cost</u>	Free
<u>Support</u>	Paid-for support provided by Apelon Inc.
<u>Community</u>	Yes, but forums, wiki and mailing lists are highly inactive
<u>Community URL</u>	http://apelon-dts.sourceforge.net/
<u>Active Development</u>	Yes
<u>Language Support</u>	English
<u>Operating Systems</u>	<p>Microsoft Windows</p> <ul style="list-style-type: none">• Windows XP Professional

	<ul style="list-style-type: none">• Windows 7 Professional• Windows Server 2003• Windows Server 2008 Linux <ul style="list-style-type: none">• Redhat Enterprise Linux 4 ES• Redhat Enterprise Linux 5 ES• Shouldn't have a problem running on other Linux distributions however (has been successfully tested on Lubuntu, an Ubuntu-based distribution)
Database Systems	Windows <ul style="list-style-type: none">• Oracle 10g Standard or Enterprise Edition• Oracle 11g Standard or Enterprise Edition• MS SQL Server 2005• MS SQL Server 2008• InterSystems Caché 2010.2• IBM DB2 9.7 Workgroup or Enterprise Edition• MySQL 5.5 Linux

	<ul style="list-style-type: none">• Oracle 10g Standard or Enterprise Edition• Oracle 11g Standard or Enterprise Edition• InterSystems Caché 2010.2• IBM DB2 9.7 Workgroup or Enterprise Edition• MySQL 5.5 <p>So far we have tested with Oracle 10g Express edition on both Windows and Linux, as well as MySQL on Linux. The Oracle databases worked fine, but there were problems with MySQL, and we have yet to run a working instance using it.</p>
Interoperability	Java API, XML-based server interface, Web Services (version 4.0)

	Requirements	Fully Complies	Partially Complies	Does not Comply	Notes + Further Information	Core	Public Facing Web UI	TSCuration	In Scope
	Terminology Service to support Rwanda's Health Information Exchange								
1.	Non-Functional Requirements								
1.1	System must have a data recovery and back-up solution				We propose to manually do this on the database and operating system level	X			Y
1.2	System must allow for real time updates	X			Allows for real-time updating through DTS Editor			X	Y
1.3	System must provide sufficient support documentation in English	X			We'll create additional user documentation for all added features for the RHEA project	X	X	X	Y
1.4	System must be easily scalable to include multiple terminologies	X			Terminologies in Apelon are separated into different namespaces. Version 4.0 will additionally allow for versioning of particular standards.	X			Y
1.5	System must provide user restricted (role-based) security		X		Access is 'all or none'. The only granularity is				N

					restricting users to certain namespaces. Specific use cases need to be enumerated				
2.	Functional Requirements								
2.1	<p>The system must be able to store the content of each of the following (in accordance to the Ministerial Instructions):</p> <ul style="list-style-type: none"> • ICD-10 (2nd edition) • Canadian Classification of Health Interventions (CCHI) • Logical Observation Identifiers Names and Codes (LOINC) • Anatomic Therapeutic Chemical (ATC) for the classification of medical products • The Rwanda Coded Medicine List (for all medications in Rwanda) • Dictionary of medicines and devices (Dm+d) for detailed route descriptions • Universal Medical Device Nomenclature System™ (UMDNS) as the standard international nomenclature and computer coding system for medical devices, consumables and reagents • SNOMED (to be deployed at a later date) 				Apelon Inc. will for an annual subscription fee of \$USD20000 provide all required terminologies as well as maintain and update all codesets. Alternatively it would require development effort on our side to import all required concepts. However this carries the additional workload of updating and synching the code sets with the latest published versions.	X			Y
2.2	The system must provide a method to load a mass number (i.e. a bulk loading) of the coding system elements.	X			Is supported through: <ul style="list-style-type: none"> • API • Import scripts • Wizard utility 	X			Y
2.3	The system must provide a method to delete a mass number (selected group) of coding system elements.	X			The ImportWizard plugin in DTS Editor provides this functionality			X	N
2.4	The system must provide a method to update the stored content by modifying, adding or deactivate items individually.		X		Items can be created and modified, but not deactivated. Versioning in release 4.0 would address			X	Y

					this.				
2.5	The system must version (deprecate) modified or deactivated codes. This is necessary to provide the context to interpret requests for older data.			X	Not supported in 3.5, but versioning in release 4.0 would address this.	X			N
2.6	The system must provide a methodology to verify a given code or identifier as a valid member of a coding system in use and this functionality should be exposed as a service that the interoperability layer can call.	X			See section 1.4 below	X			Y
2.7	The system must have sufficient privacy and security features to be able to be able to limit users from changing or deleting data. This is necessary for data integrity		X		Access is 'all or none'. The only granularity is restricting users to certain namespaces. Specific use cases need to be enumerated				N
2.8	The system must provide analytical tools to be able to: track usage, identify errors, log searches		X		All information is available through server logs. Development work would be needed to present this information in a UI. We would need to enumerate the particular data items which needs to be tracked.	X			N
2.9	The system must maintain an audit log of all changes to content, including the date and time, content changed and by whom.			X	Versioning in the 4.0 release would provide this information. We would need to spec out how this information would need to be accessed and presented.	X			N
2.10	The system must be able to respond to queries in a timely manner (less than 2 seconds) This may require a system to provide a method to tune allocation, distribution and scheduling of resources to handle requests.	X			The Apelon DTS server code is highly configurable in this regard. We will do performance tests on the system.	X			Y

2.11	The system must be able to generate a report of the inventory of terminologies. This report should be downloadable into a common format (such as csv) or printable directly.			X	Would require development effort. File formats for exporting need to be defined.		X		Y
2.12	The system must have a way to alert other systems of a change in content. This may be as simple as an alert generated from an audit which can be manually processed. It does not mean that alert is to be pushed to other systems.			X	Relates to logging, see above.	X			N
2.13	The system must be able to map a given code/identifier to a valid (active) existing code/identifier in one of the coding systems and this functionality should be exposed as a service that the interoperability layer can call.			X	But see notes below in Section 1.4 and Concluding remarks	X			Y
2.14	The system must be able to map local codes to appropriate international standards in use- this will be a many to one mapping. There must be a secure tool (and a user interface) to allow select users to provide the specific information for this mapping	X						X	Y
2.15	The system must provide a (preferably web based) user interface that will support the following: - Role based access - Searches for terms or codes using pattern matching, wildcards and tokens - Searches expected to return full and partial coding systems, as well as matches across coding systems (for example all ICD codes related to infectious diseases, or all codes including "glucose")		X		DTS's web-based interface is not sufficient to meet the requirements expected for use with RHEA. One solution may be to develop a custom web application that interfaces with the Apelon DTS backend.		X		Y
2.16	The system should be extendable to handle natural language processing (such as word normalisation and spelling correction)			X	Apelon's Termworks provides this functionality, which would come to cost.		X		N
2.17	The System provides a RESTful interface to exchange information with other systems (see message				Will be available in version 4.0.	X			Y

	specification section for more details)							
3.	Data / Field Requirements: The Terminology Service must be able to represent the following fields and store the following data and metadata for each coding system and minimal data sets of various local codes:							
	Depended on finalization of the maternal data mapping for the RHEA pilot							
4.	Communication / Messaging <u>The terminology service must be able to support the following 3 interoperability scenarios</u>							
4.1	<u>Query a partial or full list of codes from a code system</u>	X			Neither of the 3 points should be a problem	X		Y
4.2	<u>Verify if a code is valid for a specific code system</u>	X				X		Y
4.3	<u>Return a valid RHEA code for a given internal or non-standard code</u>	X				X	X	Y

Concluding Remarks

DTS has a powerful back-end and the basic functionality of integrating with the interoperability layer, exposing querying, verification and code mapping, should be feasible.

The functionality of the front-end web interface may not be sufficient. In particular, the required function of exporting terminology sets, is not available. Additional development may be necessary to develop either a new web front-end, or alter the existing DTS browser so that these particular requirements for the project may be met.

The DTS Editor provides the features needed to curate the terminology service and has a powerful plugin architecture with a rich set of plugins. Additional training may however be required for the end-users who will be using the tool.