HL7 Standard:
Clinical Quality Language Specification,
Release 1 - US Realm

Draft Standard for Trial Use

May 2015

Overview

Publication of this draft standard for trial use and comment has been approved by Health Level Seven International (HL7). This draft standard is not an accredited American National Standard. The comment period for use of this draft standard shall end 24 months from the date of publication. Suggestions for revision should be submitted at http://www.hl7.org/dstucomments/index.cfm.

Following this 24 month evaluation period, this draft standard, revised as necessary, will be submitted to a normative ballot in preparation for approval by ANSI as an American National Standard. Implementations of this draft standard shall be viable throughout the normative ballot process and for up to six months after publication of the relevant normative standard.

IMPORTANT NOTES:

HL7 licenses its standards and select IP free of charge. **If you did not acquire a free license from HL7 for this document,** you are not authorized to access or make any use of it. To obtain a free license, please visit http://www.HL7.org/implement/standards/index.cfm.

If you are the individual that obtained the license for this HL7 Standard, specification or other freely licensed work (in each and every instance "Specified Material"), the following describes the permitted uses of the Material.

A. HL7 INDIVIDUAL, STUDENT AND HEALTH PROFESSIONAL MEMBERS, who register and agree to the terms of HL7's license, are authorized, without additional charge, to read, and to use Specified Material to develop and sell products and services that implement, but do not directly incorporate, the Specified Material in whole or in part without paying license fees to HL7.

INDIVIDUAL, STUDENT AND HEALTH PROFESSIONAL MEMBERS wishing to incorporate additional items of Special Material in whole or part, into products and services, or to enjoy additional authorizations granted to HL7 ORGANIZATIONAL MEMBERS as noted below, must become ORGANIZATIONAL MEMBERS of HL7.

B. HL7 ORGANIZATION MEMBERS, who register and agree to the terms of HL7's License, are authorized, without additional charge, on a perpetual (except as provided for in the full license terms governing the Material), non-exclusive and worldwide basis, the right to (a) download, copy (for internal purposes only) and share this Material with your employees and consultants for study purposes, and (b) utilize the Material for the purpose of developing, making, having made, using, marketing, importing, offering to sell or license, and selling or licensing, and to otherwise distribute, Compliant Products, in all cases subject to the conditions set forth in this Agreement and any relevant patent and other intellectual property rights of third parties (which may include members of HL7). No other license, sublicense, or other rights of any kind are granted under this Agreement.

C. NON-MEMBERS, who register and agree to the terms of HL7's IP policy for Specified Material, are authorized, without additional charge, to read and use the Specified Material for evaluating whether to implement, or in implementing, the Specified Material, and to use Specified Material to develop and sell products and services that implement, but do not directly incorporate, the Specified Material in whole or in part.

NON-MEMBERS wishing to incorporate additional items of Specified Material in whole or part, into products and services, or to enjoy the additional authorizations granted to HL7 ORGANIZATIONAL MEMBERS, as noted above, must become ORGANIZATIONAL MEMBERS of HL7.

Please see http://www.HL7.org/legal/ippolicy.cfm for the full license terms governing the Material.

Ownership. Licensee agrees and acknowledges that **HL7 owns** all right, title, and interest, in and to the Trademark. Licensee shall **take no action contrary to, or inconsistent with**, the foregoing.

Licensee agrees and acknowledges that HL7 may not own all right, title, and interest, in and to the Materials and that the Materials may contain and/or reference intellectual property owned by third parties ("Third Party IP"). Acceptance of these License Terms does not grant Licensee any rights with respect to Third Party IP. Licensee alone is responsible for identifying and obtaining any necessary licenses or authorizations to utilize Third Party IP in connection with the Materials or otherwise. Any actions, claims or suits brought by a third party resulting from a breach of any Third Party IP right by the Licensee remains the Licensee's liability.

Following is a non-exhaustive list of third-party terminologies that may require a separate license:

Terminology	Owner/Contact
Current Procedures Terminology (CPT) code set	American Medical Association http://www.ama-assn.org/ama/pub/physician-resources/solutions-managing-your-practice/coding-billing-insurance/cpt/cpt-products-services/licensing.page?
SNOMED CT	International Healthcare Terminology Standards Developing Organization (IHTSDO) http://www.ihtsdo.org/snomed-ct/get-snomed-ct or info@ihtsdo.org
Logical Observation Identifiers Names & Codes (LOINC)	Regenstrief Institute
International Classification of Diseases (ICD) codes	World Health Organization (WHO)

Clinical Quality Language Specification Overview

Contents

This document provides an overview of the contents of the HL7 Clinical Quality Language Specification, as well as a guide to the various implementation and tooling artifacts provided with the specification as supplemental materials.

The specification package contains the following materials:

Path	Description
HL7_Clinical_Quality_Language_Specification_R1.docx	Specification documentation
cql\cql.g4	ANTL4 Clinical Quality Language grammar
elm\model\elm.eap	Enterprise Architect UML Model for Expression Logical Model
elm\model\elm.xmi	XMI representation of UML Model for Expression Logical Model
elm\schema\expression.xsd	Core Expression Schema for physical representation of Expression Logical Model
elm\schema\clinicalexpression.xsd	Clinical Expression Schema for physical representation of Expression Logical Model
elm\schema\library.xsd	Library Schema for physical representation of Expression Logical Model
examples	This folder contains examples of libraries that have been developed as part of the specification. These examples are not intended to be clinically valid, but rather to demonstrate the expression of various clinical artifacts in CQL.

As discussed in the HL7 Clinical Quality Language Specification document, the CQL specification is layered as follows:

- Author View – Artifact authors view
- Logical View – Logical representation of expression logic
- Physical View –Physical representation of expression logic

The ANTLR4 grammar file is the formal specification for the Author View; the UML model for the Expression Logical Model (ELM) is the formal specification for the Logical View; and the XML schemata for the ELM is the formal specification for the Physical View.
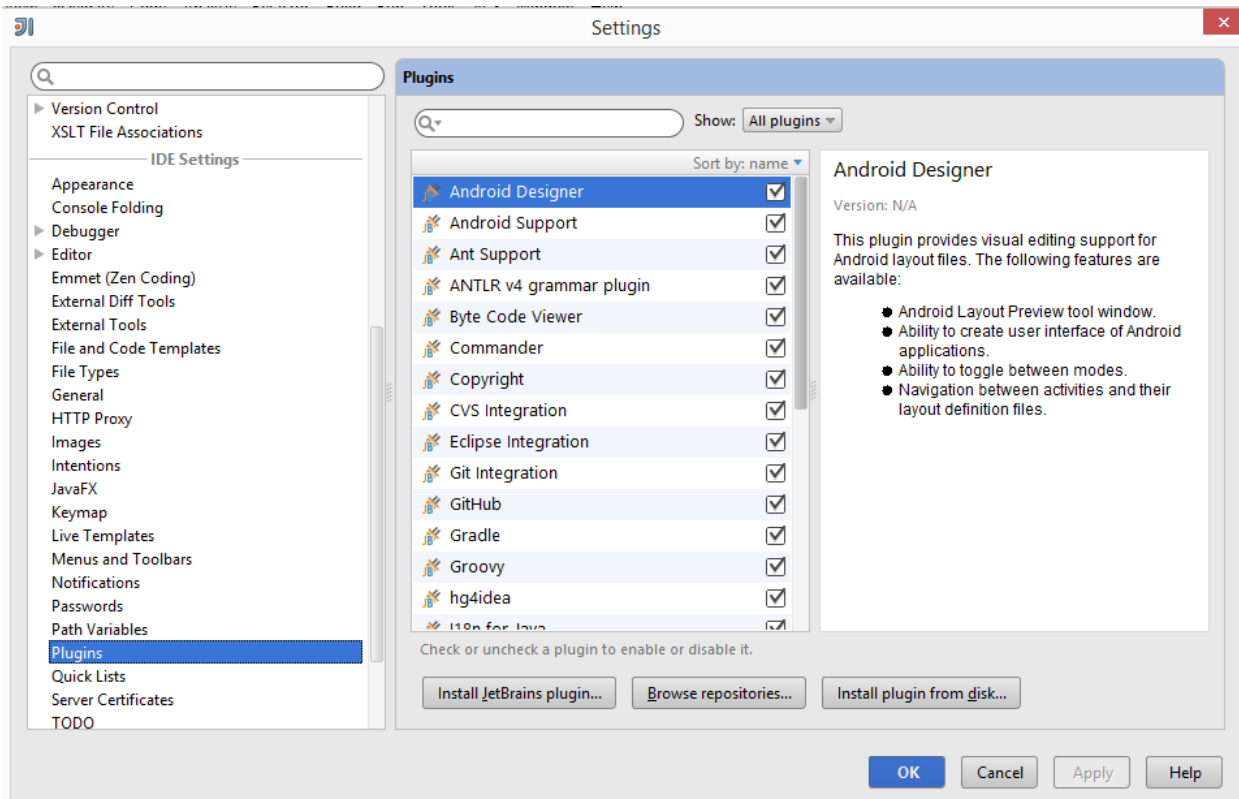
Viewing the CQL Grammar

The CQL ANTLR4 grammar provides the formal specification of the high-level syntax for CQL. This grammar file can be viewed in any text editor, but some integrated development environments (IDEs)
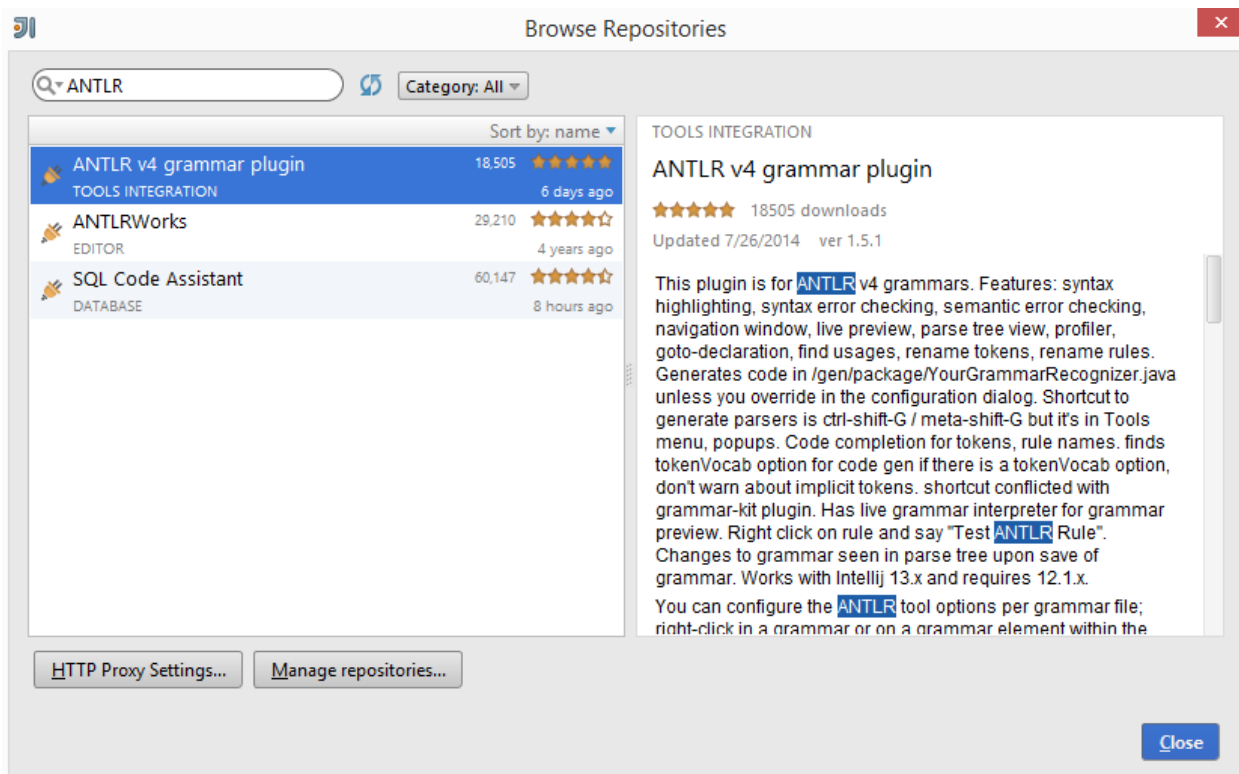
provide richer support for interacting with ANTLR4 grammars. JetBrains provides a free community edition of their Java IDE IntelliJ that can be used for this purpose:

http://www.jetbrains.com/idea/download/

Once the IntelliJ environment is installed, the ANTLR4 grammar plugin must be installed. In the IDE, select File|Settings. In the settings dialog that opens, select Plugins under the IDE Settings category:
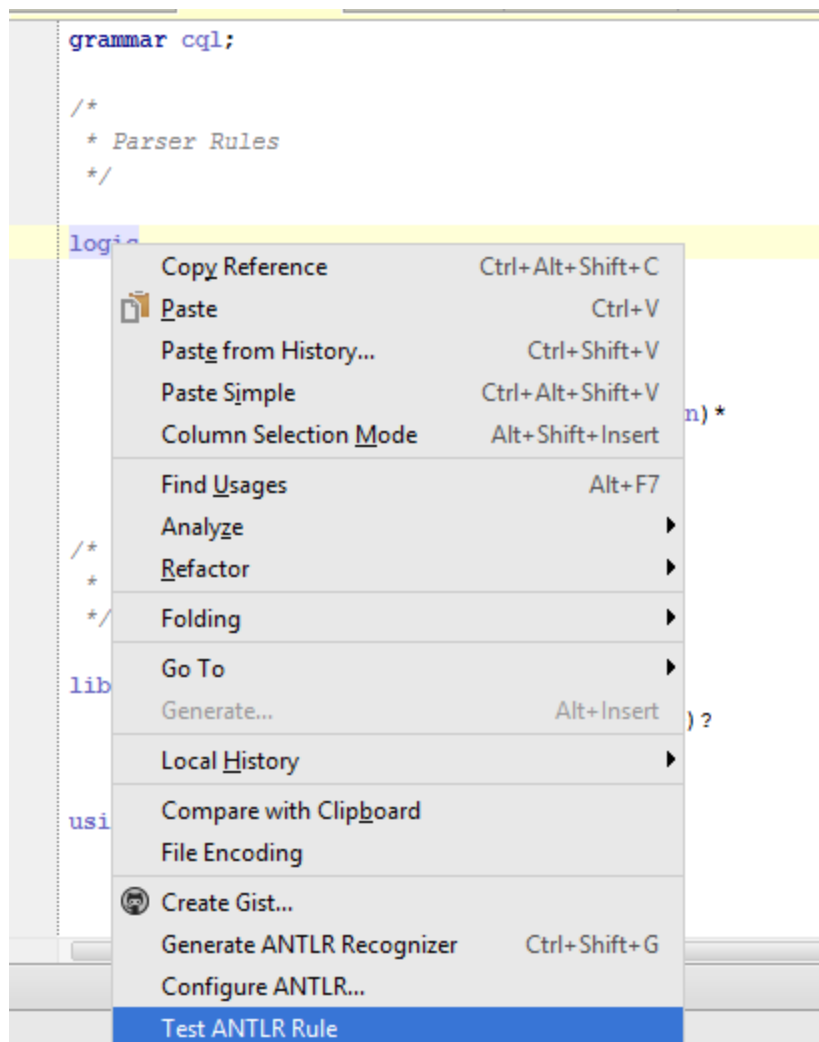

Click Browse repositories... and in the search, type ANTLR:

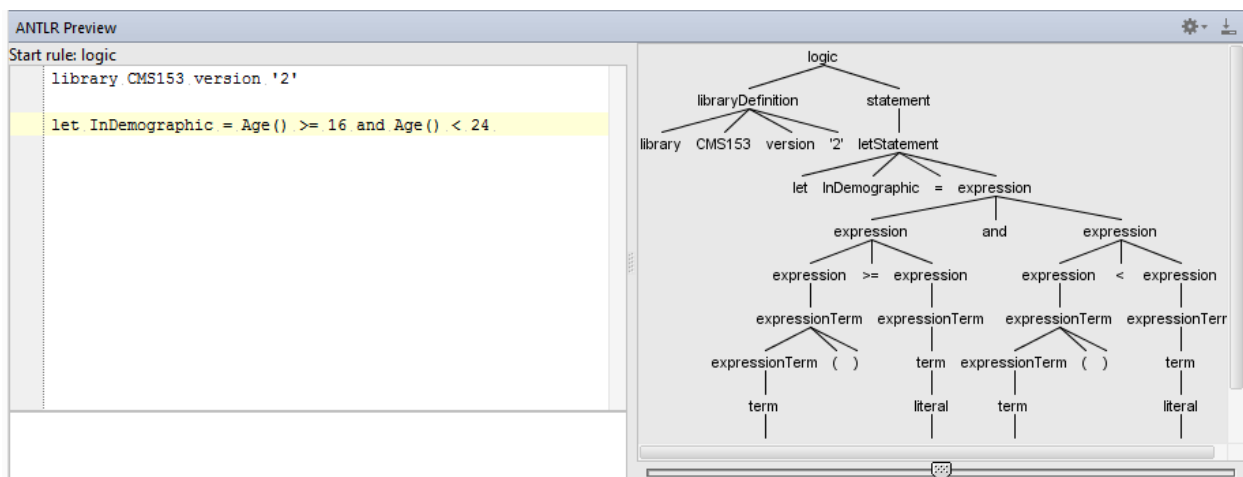HL7 Standard: Clinical Quality Language, Release 1 - US Realm
May 2015

Right-click on the ANTLR v4 grammar plugin, and select Download and Install.

Once the plugin is installed, open the CQL g4 file in the IDE. To use the grammar, right-click on a grammar rule, such as *logic* and select "Test ANTLR Rule":

This will bring up the ANTLR Preview window which will then allow you to type CQL, and will parse and verify the input, as well as show a parse tree for the statement:

Viewing the ELM UML Model

The XMI format used to distribute the ELM UML Model is a standard format for physical representation of UML Models, and any standard model viewer will be able to display it. In addition, the Enterprise Architect (eap) file is included, which can be viewed with the free Enterprise Architect Viewer from Sparx Systems, available here:

http://www.sparxsystems.eu/enterprisearchitect/ea-lite-edition/

Viewing the XML Schemata

The XML Schemata for the ELM physical model are distributed as standard XSD files, and any standard XSD viewer such as Altova XML Spy will be able to display it.