

C-DAC's Toolkit for LOINC (CLNtk)

Electronic Health Records (EHR) Standards for India were put forward by the Ministry of Health & Family Welfare (MoH&FW), Government of India in December 2016. The standards aim to bring uniformity in the creation and maintenance of healthcare information and address various aspects viz. structure, exchange, content, security, and privacy.

Logical Observation Identifiers Names and Codes (LOINC) is one of the coding standards recommended for recording tests, measurements, and observations used for processing results and reports in the Laboratory and Imaging Information Systems. To promote usage and adaption of LOINC in the country, under the support of MoH&FW, Centre for Development of Advanced Computing (C-DAC), Pune has developed C-DAC's Toolkit for LOINC (CLNtk) to enable ease of integration of LOINC in the healthcare application.

C-DAC's Toolkit for LOINC (CLNtk)

CLNtk is a specially designed FOSS application for easy access and integration of the LOINC standard in healthcare applications. The toolkit provides simple-to-use REST APIs for LOINC standard integration. It enables clinicians and researchers to find relevant LOINC codes through its components including, the long common name, short name, display name, and other related information. The salient features of the C-DAC's toolkit for LOINC include:

Salient Features

- Free & Opensource Software (FOSS) under Apache License v2.0
- Easy to use RESTFUL API for hassle-free integration of LOINC
- Provides Lucene index creation from the LOINC standard CSV files
- RESTFUL API for search, expand panel, lookup. Also, supported APIs to fetch information from LOINC standard
- Supports Lucene based full-text search
- Enables searching with advance search
- Toolkit based on platform-independent technologies
- Quick development or augmentation of existing applications using components
- API Documentation available

What's new in C-DAC's Toolkit for LOINC v2.0?

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- Migrated from Elasticsearch to Apache Lucene:
 - Lower memory footprint compared to Elasticsearch, eliminating the need for a separate server (Elasticsearch requires at least 4GB RAM).
 - Minimal and user-friendly configuration, requiring only deployment of the WAR file on Tomcat 10.1.x with a specified index storage location.
 - Faster response times due to the absence of a client-server model, unlike Elasticsearch's continuous communication overhead

- Lucene is embedded directly within the application, removing the complexity of managing an external Elasticsearch cluster.
- Infrastructure costs for hosting are reduced as compared Elasticsearch.
- Updated OpenAPI specifications from 2.0 to 3.0
- Added new supporting API to display the LOINC release version being indexed.
- Redesign of the config page
- Bug fixes and improvements

What's in C-DAC's Toolkit for LOINC?

The C-DAC's toolkit for the LOINC zip package contains the following:

loincserv.war

- A war that can be readily deployed along with the application or centrally by the vendor for one or more products/deployments
- Provides Ready to call Representational State Transfer (REST) APIs LOINC search and lookup LOINC codes and other information.

Demo Page

The sample Laboratory Demo page shows the use of REST APIs provided by CLNtk. The demo page provides one of the ways to search and record various laboratory tests with LOINC standards code.

The package also contains license.txt and NOTICE.txt

Targeted User Community

The developed C-DAC's toolkit for LOINC (CLNtk) will be a great help to enable the exchange and aggregation of clinical results for care delivery, outcome management, and research by providing a set of universal codes and structured names to unambiguously identify things you can measure or observe, building applications used in medical domains.

The healthcare domains can be Laboratory Information System (LIS), Electronic Health Record (EHR) Systems, Hospital Information Systems (HIS), Clinical Information System, Software Vendors that make applications/systems/devices and requires support to health informatics standards. Health Informatics Professional studying or doing research in the area of medical data capture, storage, transmission, visualization, etc. will also need the LOINC to interact with medical systems.

Availability

The C-DAC's toolkit for LOINC (CLNtk) is available from the C-DAC website www.cdac.in under Apache License v2.0 as free and open-source software.

LOINC Table Files are free for access by registration. Users are advised to register and obtain a suitable license to use LOINC codes in their software and work from <https://www.loinc.org>

For any information regarding C-DAC's toolkit for LOINC please write to C-DAC at [sdk-eng@cdac.in](mailto: sdk-eng@cdac.in).