InterSystems IRIS for Health Overview

Technology Brief

InterSystems™
IRIS Health

InterSystems IRIS for Health Overview

InterSystems IRIS for Health™ is the world's first and only data platform specifically engineered to extract value from healthcare data. It empowers you to rapidly create and scale healthcare's next breakthrough applications. InterSystems IRIS for Health is for software developers who:

- Have brilliant ideas but haven't found a platform that is fast, reliable, or scalable enough to support their solutions
- Are looking for a standards-based platform, including the ability to read and write HL7 FHIR resources, for creating and supporting the next generation of healthcare applications
- Want to make a difference in care through analytics and applications of machine learning and artificial intelligence, based on diverse data from across the care continuum

InterSystems IRIS for Health addresses these needs with blazing speed and advanced interoperability, analytics, and machine learning technology, plus out-of-the-box transformations between healthcare messaging formats. It provides the fastest route to get innovative healthcare apps up and running quickly and delivering sustainable value.

Use cases for InterSystems IRIS for Health include:

- Developing new digital health applications that incorporate data from multiple sources using different standards.
- Providing connectivity between medical devices and EHRs to track device performance and measure efficacy, and for predictive maintenance.
- Innovations around existing information systems to deliver new functionality or enhance existing features. For example, enhancing a radiology application with patient data.
- Delivering real-time, predictive analytics and modeling capabilities that could improve clinical trial awareness and recruitment.
- Serving up massive quantities of data for machine learning or artificial intelligence, and creating health information systems that deliver intelligent workflows with real-time analytics.

Key Features

Healthcare Interoperability

In a fragmented healthcare system, data is stored in a multiple sources and in a variety of formats and standards. To ensure you can leverage all of this data in your solutions, InterSystems IRIS for Health offers extensive development tooling for healthcare interoperability standards and templates. These include:

- FHIR (DSTU2, STU3, R4)
- HL7 V2 and HL7 V3
- IHE Profiles, including XDS.b, XCA, PIX, PDQ, and MHD
- CDA/C-CDA Documents
- DICOM
- X12

InterSystems IRIS for Health provides pre-built extensible data transformations between modern and legacy data representations. For example, using InterSystems IRIS for Health built-in features, you can:

- Transform an HL7 V2 message from one schema version to another
- Produce HL7 V2 messages from a CDA document
- Transform a portion of a CDA document out as FHIR resources

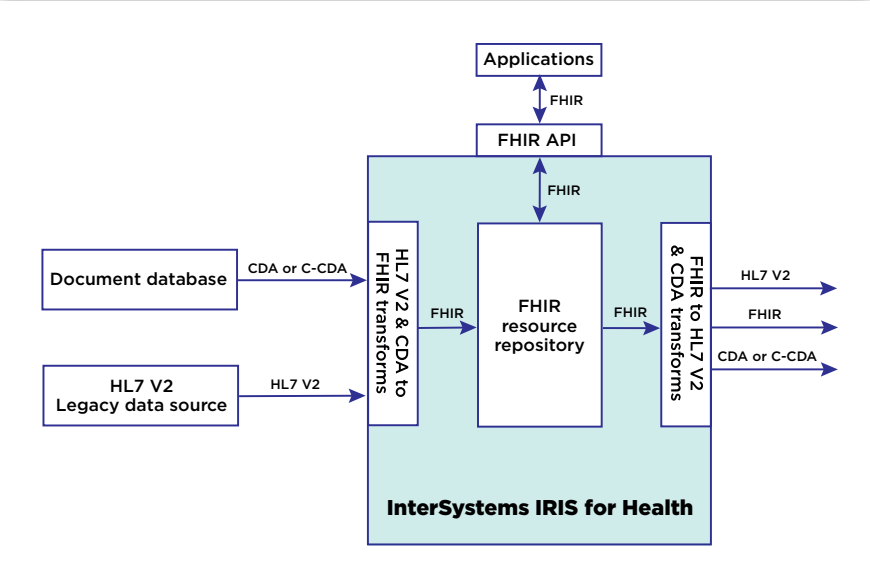
FHIR Support

InterSystems IRIS for Health provides the building blocks needed to develop FHIR applications, including:

- A base FHIR server implementation supporting standard FHIR RESTful API
- A FHIR resource repository supporting all FHIR resource types
- FHIR client components for handling client-side operations
- Built-in data transformations between FHIR and other healthcare interoperability standards such as HL7 V2 and CDA
- Support for FHIR-based IHE Profiles, including PIXm, PDQm, and MHD

The InterSystems IRIS for Health FHIR repository offers full read/write capabilities, receiving or sending FHIR resources via the FHIR RESTful API in JSON or XML formats. This allows applications built on the latest technologies to use FHIR data — new or mapped from legacy systems — for patient care, quality improvement, research, and other use cases.

THE INTERSYSTEMS IRIS FOR HEALTH FHIR REPOSITORY OFFERS FULL READ/WRITE CAPABILITIES.



InterSystems IRIS for Health provides everything a developer needs to access data from across the care continuum, including data transformations and a read/write HL7 FHIR resource repository.

High-Performance Transaction Processing and Analytics

At the core of InterSystems IRIS for Health is a proven, enterprise-grade, distributed, hybrid transactional-analytic processing database to support real-time applications. It can ingest, process, and store transactional data at high rates while simultaneously processing high volume analytic workloads involving historical and real-time data (including ACID-compliant transactions).

Proven Scalability

InterSystems IRIS for Health easily scales horizontally (through sharding and our Enterprise Cache Protocol) and vertically (through parallel SQL queries) to meet the needs of your application. Whether it's high numbers of concurrent users, a massive dataset to analyze, or both at the same time, InterSystems IRIS for Health scales out to a distributed architecture on affordable hardware to reduce total cost of ownership.

Robust Security

InterSystems IRIS for Health provides a strong, flexible, consistent, and high-performance security infrastructure while minimizing its burden on application performance. This security architecture is based on authentication, authorization, auditing, and database encryption.

- **Authentication.** InterSystems supports multiple authentication mechanisms, including two-factor authentication.
- **Authorization.** Using our System Management Portal, you can easily assign and manage role- and application-based resource access privileges.

- **Auditing**. InterSystems products record all system and application events in an append-only log, which can be queried using SQL or a reporting tool.
- **Database encryption.** InterSystems IRIS for Health encrypts data-at rest and data-in-motion. To protect entire databases it offers block level encryption.

Unified Development Environment

InterSystems IRIS for Health includes a unified graphical and code-based environment that simplifies and accelerates development and maintenance of real-time, data-rich solutions. It provides a consistent representation of diverse programming models, programming interfaces, and data formats. The InterSystems IRIS for Health trace capability enables you to track and see the behavior of messages to and from your application, simplifying debugging and diagnosis, lowering development costs, and accelerating time to market.

Freedom of Choice

Choice of Language. InterSystems IRIS for Health supports a variety of development languages, including a native API for Java, .NET, and Python. Each interface connects to the multidimensional storage data structures that underlie the platform's object and SQL interfaces. A Dynamic Gateway makes calling out to the different languages fast and easy.

Choice of Data Model. InterSystems IRIS for Health features a multi-model architecture that allows you to use the data model — relational, object, or direct/native access — that best fits each task in your application. Each data model is accessible through the language of your choice. Multi-model features include:

- Industry-standard APIs for SQL and object access
- An API to store data in a custom optimized data structure
- A reusable database connection that supports using the best data model for each task
- APIs for your language of choice (including Java, .NET, and ObjectScript)
- An underlying consistent structure, avoiding data duplication

Full Life Cycle API Management

InterSystems API Manager (IAM) enables you to monitor and control traffic to and from your Web-based APIs. You can perform configuration using a Web-based user interface and API calls, which simplifies remote deployments. The more distributed your environment the more critical it becomes to properly govern and monitor your API traffic. IAM enables you to route all your traffic through a centralized gateway and forward API requests to appropriate target nodes.

This enables you to:

- Monitor all your API traffic in a central spot
- Plan, document, and update the list of APIs you are using and the servers that provide them
- Identify issues before they become critical
- Control API traffic by throttling throughput, configuring allowed payload sizes, whitelisting and blacklisting IP addresses and domains, and quickly taking endpoints into maintenance mode
- Onboard internal and external developers by providing interactive API documentation through a dedicated and customizable developer portal
- Secure your APIs in a central location

Embedded and Open Analytics

InterSystems IRIS for Health provides embedded, state-of-the-art analytics capabilities for distributed SQL, business intelligence, and natural language processing in data-intensive, real-time applications. It can incorporate a wide range of third-party tools, such as Microsoft Power BI, and open source analytics packages, such as Apache Spark.

AI, and Machine Learning for SQL Developers

InterSystems IntegratedML brings the power of machine learning to SQL developers. With three simple SQL statements, users can create and train machine learning models on their data, and then use those models to make predictions on unseen data in SQL-based applications. This turnkey tool dramatically increases the productivity of your data team and enables data scientists to focus on only the most complex problems, without having to worry about data access or model deployment. InterSystems IRIS for Health supports connection to common machine learning environments like Apache Spark and KNIME, as well as an ML toolkit to embed Python or R code into applications and business processes.

Apache Spark Integration

Apache Spark is a high-performance open source cluster computing framework. It can be 100 times faster working on large distributed data sets than Apache Hadoop (MapReduce), and many common data processing, machine learning and statistical algorithms are available for it. InterSystems IRIS for Health integrates directly with Apache Spark via a native Spark connector, and its distributed deployment models maximize cluster computing efficiency.

Business Intelligence

InterSystems IRIS for Health provides fully integrated support for business intelligence (BI) modeling, analysis, and end-user dashboards. An InterSystems IRIS for Health BI model is based directly on transactional data and any other data that might be needed. A fully automated

synchronization option avoids the need for extract, transform, and load processing. Drag and drop analysis capabilities enable non-technical users to examine the data at any level, performing complex queries with ease. InterSystems IRIS for Health dashboards provide a way to display live business metrics and give restricted analysis options to other users.

InterSystems IRIS for Health Business Intelligence uses selective Cube Build, which makes it much faster to add measures and dimensions to a build, without bringing down the cube. By eliminating the need to rebuild the cube each time, hours to days of time can be saved depending on the size of the dataset.

Predictive Model Markup Language Support

By providing embedded support for Predictive Model Markup Language (PMML), InterSystems IRIS for Health allows you to incorporate predictive models created by data mining and machine learning algorithms using external tools and applications. When a PMML model is loaded in InterSystems IRIS for Health, the system generates native code to execute the model in real-time, without any external tool or performance-inhibiting passing of data across systems. This capability, fully integrated with IntegratedML, enables seamless incorporation of predictive models created by data scientists and other specialists into InterSystems IRIS for Health data processing pipelines and business processes.

Natural Language Processing

InterSystems IRIS for Health provides natural language processing (NLP) capabilities that identify concepts and their context in natural language text, without requiring upfront work or domain knowledge. These advanced natural language processing capabilities are embedded in the product and can be incorporated in business processes, enabling organizations to include information from notes, social media, and other sources of unstructured data.

Cloud Provisioning and Management

InterSystems IRIS for Health provides a simple, intuitive way to provision and deploy services on cloud and on-premises based infrastructures. Using InterSystems Cloud Manager, InterSystems IRIS for Health delivers the benefits of infrastructure as code (IaC), immutable infrastructure, and containerized deployment of applications. InterSystems IRIS for Health runs on AWS, GCP, Azure, or private cloud platforms.

Try InterSystems IRIS for Health for Free

You can try InterSystems IRIS for Health for free by downloading it from Docker Hub (capacity constraints apply) at **https://bit.ly/IHDocker**

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Creative data technology