

InterSystems IRIS Data Platform Technology Guide



Next-Generation Data Management Software
for Critical Enterprise Digital Transformation Initiatives





INTERSYSTEMS IRIS
DATA PLATFORM IS
NEXT-GENERATION
DATA MANAGEMENT
SOFTWARE THAT
SPEEDS AND SIMPLIFIES
THE IMPLEMENTATION
AND MAINTENANCE OF
SMART DATA FABRIC
ARCHITECTURES.

Introduction

Today more than ever before, organizations are striving to gain a competitive edge, deliver more value to customers, reduce risk, respond more quickly to the needs of the business, and out-innovate the competition. To achieve these goals, organizations need easy access to a single view of accurate, current, consistent, and trusted data. However, the increasing complexity and number of data sources and data volumes make this difficult to achieve in practice. As data grows, so too does the prevalence of data silos, making accessing, integrating, and leveraging data from internal and external data sources a challenge.

A Smarter Approach to Data Management

Recently, **enterprise data fabrics** have emerged as a much-needed architectural approach that is providing organizations with visibility and access to data from across the entire business, without the limitations typically associated with prior approaches. Data fabrics can integrate, transform, and harmonize data from disparate sources—**on demand**—to make it usable and actionable for a wide range of business applications.

Smart data fabrics take this approach a step further by incorporating a wide range of analytics capabilities, including data exploration, business intelligence, natural language processing, complex business rules, and machine learning directly within the fabric, enabling organizations to gain new insights and power intelligent and prescriptive services and applications.

In contrast with earlier approaches, data fabrics allow applications and line-of-business personnel to access information from source systems on demand, as it's needed, eliminating the latencies usually associated with data lakes, data warehouses, data marts, and manual techniques. Data that resides in different applications, silos, and sources inside and outside the organization can be accessed, integrated, harmonized, and even analyzed as it's accessed, without the need to create yet another copy of the data. It is a fundamentally different approach that is bringing quantitative business benefits to every industry.

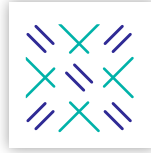
Cutting Through The Complexity

The challenge, however, is that implementing a data fabric can require dozens of data management services and products, resulting in complex architectures, delayed and unwieldy implementations, cumbersome maintenance, and a high total cost of ownership.

Addressing this key challenge, InterSystems IRIS® data platform is next-generation data management software that speeds and simplifies the implementation and maintenance of smart data fabric architectures. It is a comprehensive cloud-first product built from the ground up on a consistent architecture that provides many of the functional capabilities required for implementing data fabrics to power a wide range of critical enterprise applications, including Business 360, Customer 360, Supply Chain Visibility, IT/OT Convergence for Manufacturing, and Member 360 for Healthcare.

What Is a Smart Data Fabric?

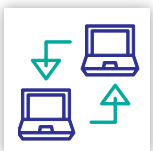
A smart data fabric is an architectural pattern that dynamically orchestrates data from disparate data sources intelligently and securely, on demand. It leverages various sources, such as production applications, data lakes, data warehouses, NoSQL and relational databases, public and private APIs, and files, with a wide range of embedded analytics and data exploration capabilities to deliver current, consistent, and trusted data to support various applications, analytics, and use cases.



InterSystems IRIS Data Platform

InterSystems IRIS data platform provides many of the capabilities required to implement real-time, smart data fabric architectures in a single product, eliminating the need to implement, integrate, and maintain dozens of different technologies. Key components of InterSystems IRIS data platform include:

- Data and application integration
- Database management
- Analytics
- Application development support
- Flexible deployment
- Security

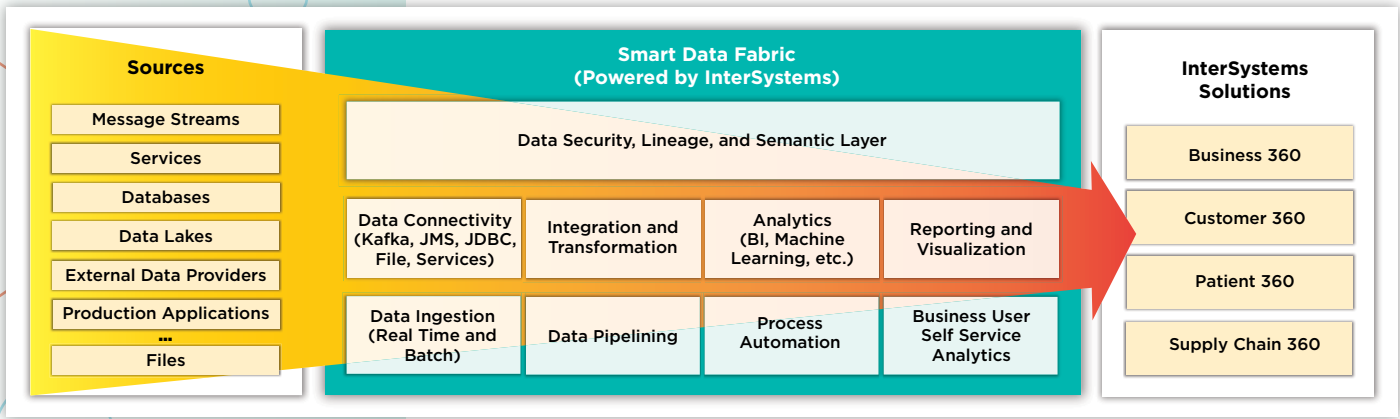


Data and Application Integration: A New Approach

Nearly every application today needs to connect to other systems, whether to simply transfer data, offer new services that aggregate information from multiple sources, support business users with consistent data from different systems, or build seamless composite end-to-end workflows to automate and optimize processes.

Connect and Collect

InterSystems IRIS provides a low-code approach to data and application integration that supports both *connect* and *collect* approaches. *Connect* enables new applications to dynamically access information on demand, without creating additional copies of the data. Of course, data can be stored within the InterSystems IRIS high-performance, highly scalable multi-model, multi-workload database (*collect*), and applications can leverage both approaches for the highest performance and resource efficiency.



Smart Data Fabric Architecture

Low-Code Development

InterSystems IRIS provides graphical and drag-and-drop editors for designing integration flows and business processes, incorporating business rules and human workflow, and defining data and message transformations. It seamlessly manages all connection states, connection adapters, message queues, and payloads between InterSystems IRIS and external applications and systems.

Message Management

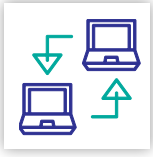
Messages are automatically saved and can be easily audited and visually tracked. This eliminates the need to develop additional application logic to monitor inbound/outbound traffic, queues, and message volumes; for persisting historical message content; for message resending, rerouting, alerting, and event logging; or even for coordinating multiple simultaneous threads of executing process logic.

Extensibility

Integration capabilities are flexible and extensible. In addition to its built-in integration capabilities, InterSystems IRIS supports the incorporation of existing integration components written in Java, .NET, and Python, enabling developers to build and integrate custom inbound and outbound adapters that can be called at runtime and can send messages to other components.

API Support

InterSystems IRIS provides full life-cycle API management capabilities that support discovering, consuming, routing, throttling, securing, logging, monitoring, and monetizing APIs to support a modern microservices approach to development.



Multi-Model, Multi-Workload Database Management

At the core of InterSystems IRIS is an ultra-high-performance, multi-model, multi-workload database management engine that supports both vertical and horizontal scalability.

Multi-Model

Within the InterSystems IRIS database, data is stored once and can be accessed as tables, objects, documents, key-value pairs, or multidimensional arrays without duplicating data or executing performance-killing mapping between models. All access methods can be simultaneously used on the same data with full concurrency. This pure approach to multi-model database management allows developers to use the most appropriate model types for their applications within a single environment.

Multi-Workload

InterSystems IRIS is optimized for real-time applications that require high-throughput data ingestion with high-performance concurrent analytics at scale. It is deployed in mission-critical financial services, IoT, supply chain, and healthcare applications that must have the capacity to ingest thousands or millions of records per second while simultaneously querying the incoming data in real time. In competitive testing, InterSystems IRIS performs up to 48 times faster than popular database management software.¹

Vertical and Horizontal Scalability

InterSystems IRIS supports both vertical and horizontal scaling. Vertical scaling takes advantage of bigger, multicore machines through the efficient and fully automated use of parallelization, which enables organizations to right-size infrastructure resources in the cloud to achieve optimal price-performance ratios. However, big, multicore machines can quickly become cost prohibitive, both in the cloud and on premises. Thus, InterSystems IRIS also provides a unique technology for horizontal scaling, InterSystems Enterprise Cache Protocol (ECP).

ECP enables horizontal scaling of the number of users by caching data on application servers. User queries are satisfied from the local application server cache, if possible, retrieving data from the data server only if necessary. ECP automatically synchronizes the data and is entirely transparent, to both users and applications, providing superior performance and resource efficiency as workloads increase.

InterSystems IRIS enables horizontal scaling of data through sharding—splitting up very large databases onto multiple machines. Queries are run in parallel on each shard, and the results are aggregated before being returned to the user.

Sharding and ECP are transparently combined so applications can handle both large volumes of data and high volumes of compute workloads efficiently and independently.

SHARDING AND ECP ARE TRANSPARENTLY COMBINED SO APPLICATIONS CAN HANDLE BOTH LARGE VOLUMES OF DATA AND HIGH VOLUMES OF COMPUTE WORKLOADS EFFICIENTLY AND INDEPENDENTLY.

¹“InterSystems Launches Publicly Available & Customizable Speed Test for Database Management Systems,” InterSystems, July 20, 2020.



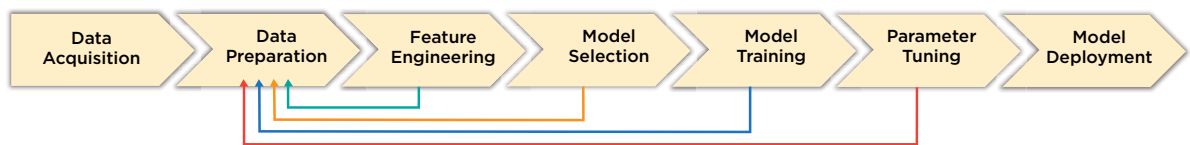
Analytics

InterSystems IRIS provides a range of powerful, built-in analytics capabilities, the ability to run a wide variety of analytics directly within applications close to the data, and the ability to incorporate best-of-breed analytics tools.

Machine Learning (ML)

InterSystems IntegratedML[®] is an embedded feature of InterSystems IRIS that enables application developers to easily create and train ML models without the need for advanced data science skills. This makes it possible for organizations that don't yet have data scientists on staff to develop and deploy ML models using SQL quickly and easily. It also improves the effectiveness of organizations that already have teams of skilled data scientists on staff by automating much of the tedious work involved in data wrangling, feature engineering, and model building and tuning, thus enabling data scientists to become more productive and focus on higher-value tasks.

The Machine Learning Process



Automating the Machine Learning Process With IntegratedML



Deep integration with InterSystems IRIS enables applications to seamlessly execute these ML models directly on the data, in response to real-time events and transactions, without extracting or moving any models or data.

Business Intelligence

InterSystems IRIS provides interactive business intelligence capabilities for data exploration and dashboard development. High-performance interactive dashboards can incorporate complex analytical processing and can be embedded in real-time applications to provide business users with insights at the point of action.

Adaptive Analytics

InterSystems IRIS Adaptive Analytics provides business users with self-service analytics capabilities to visualize, analyze, and interrogate data from multiple sources in a consistent format. Its semantic layer and drag-and-drop data modeling capabilities allow business users to interactively explore the data to make timely and accurate business decisions.

Natural Language Processing (NLP)

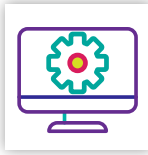
Built-in capabilities for NLP and text exploration provide insights from unstructured data, which can be embedded within applications. NLP is often used with InterSystems IRIS to create new ML features from text that can in turn be used to develop and train ML models. InterSystems text exploration technology—also available as open source—is unique in that it uses a bottom-up approach, discovering concepts and relations within the text itself.

Support for Third-Party Analytics Technologies

In addition to its rich set of embedded analytics capabilities, InterSystems IRIS is an open platform, which means developers, analysts, and business users can work with their preferred third-party tools and technologies for data exploration, business intelligence, NLP, AI, and ML. The ability to leverage a wide range of popular third-party analytics tools directly into InterSystems IRIS applications provides the freedom of choice to use familiar best-of-breed technologies to gain valuable insights and execute intelligent programmatic actions in response to real-time events.

Reporting

InterSystems IRIS enables the creation of pixel-perfect forms and reports in a variety of formats and also supports scheduling, exporting, and embedding reports in customer and partner applications.



Application Development

InterSystems IRIS provides a complete application development environment for building sophisticated data- and analytics-intensive applications that connect data and application silos. It is designed to work with all of the common development technologies in an open, standards-based fashion and supports both server-side and client-side programming.

Your Language. Your Choice.



Java



C#/.NET



Node.js



Python



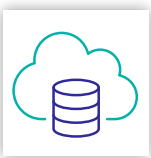
ObjectScript

Server-Side Development

Server-side development provides the highest performance, since the applications run close to the data. InterSystems IRIS supports server-side application development with both Python and InterSystems ObjectScript. Python is a popular programming language with more than 8 million developers and hundreds of thousands of available libraries. ObjectScript is a high-performance, flexible object programming language optimized for developing complex data- and analytics-intensive applications with InterSystems IRIS. Developers can build applications in either—or both—programming languages, choosing whichever language is best for the application. Both Python and ObjectScript code execute within the InterSystems IRIS kernel on the server for extremely high performance.

Client-Side Development

InterSystems IRIS supports client-side development using many popular development technologies, including Java, C#/.NET, Node.js, Python, and ObjectScript, for the greatest flexibility in supporting a wide range of developers and existing applications. InterSystems IRIS objects can be exposed through built-in libraries to Java, .NET, C++, JavaScript, and many other languages.



Deployment

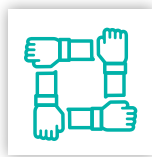
InterSystems IRIS is available as a managed service (Data Platform as a Service) and can be deployed on all major cloud platforms, in private clouds, on premises, and in multi-cloud and hybrid environments, offering the following advantages:

- Eliminates lock-in to a single cloud provider
- Runs on standard hardware to support on-premises, private, and hybrid deployments with no custom configurations required
- Seamlessly supports various cloud and hybrid deployments through one single API, without requiring any modifications
- Continuously leverages the optimizations released by the various cloud providers and hardware vendors



Security

InterSystems® technology is regularly deployed in highly regulated, mission-critical environments, including healthcare, financial services, government, and supply chain. InterSystems is constantly adding new security capabilities to support evolving requirements and standards for authentication, authorization, encryption, and auditing.



InterSystems: Industry and Customer Recognition

Industry analyst firm Gartner® most recently recognized InterSystems as a Challenger in its “Magic Quadrant™ for Cloud Database Management Systems.”²

Industry analyst firm Forrester has recognized InterSystems IRIS data platform as a Leader in its report The Forrester Wave™: Multimodel Data Platforms, Q3 2021 and included it in the Now Tech: Enterprise Data Fabric, Q1 2022 vendor report.³

About InterSystems

Established in 1978, InterSystems is the leading provider of next-generation solutions for enterprise digital transformations in the healthcare, finance, manufacturing, and supply chain sectors. Its cloud-first data platforms solve interoperability, speed, and scalability problems for large organizations around the globe. InterSystems is committed to excellence through its award-winning, 24×7 support for customers and partners in more than 80 countries. Privately held and headquartered in Cambridge, Massachusetts, InterSystems has 36 offices in 25 countries worldwide. For more information, please visit [InterSystems.com/IRIS](https://www.inter-systems.com/IRIS)

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³N. Yuhanna, G. Leganza, and R. Perdoni, The Forrester Wave™: Multimodel Data Platforms, Q3 2021, July 15, 2021; and N. Yuhanna, G. Leganza, and K. Monteverde, Now Tech: Enterprise Data Fabric, Q1 2022, Forrester, Feb. 3, 2022.



