Tackle integration challenges with Infor Cloverleaf Integration Suite

Healthcare

Learn why Cloverleaf is the healthcare industry's most widely deployed integration platform

The Infor Cloverleaf® Integration Suite is an **award-winning healthcare interoperability platform** that addresses the fundamental obstacles to healthcare integration.[1] The Cloverleaf Integration Suite can act as the digital backbone for your integration needs now and future interoperability strategy:

- Modernize legacy assets and maximize your investment in existing clinical applications

- Orchestrate participation in the Fast Healthcare Interoperability Resources (FHIR) application programming interface (API) ecosystem

- Enable secondary uses of data

- Curate and enrich data for modern cloud analytics

- Implement artificial intelligence-infused integrated solutions to innovate and disrupt

Cloverleaf is the healthcare industry's most widely deployed integration platform because of its ease of use, power to tackle the most complex integration challenges, customer-proven scalability and reliability, and Infor's ongoing commitment to innovation and customer service.[2]

The core Infor Cloverleaf Integration Suite includes the following components:

Cloverleaf Engine—Cloverleaf is a complete clinical integration platform that can handle all your data exchange challenges to share information across a patient's continuum of care. Intuitive, visual development simplifies interface development, maximizes reuse of artifacts, and delivers the flexibility, scalability, and high-performance requirements necessary for healthcare integration. The Cloverleaf engine is scalable enough to design, manage, and deploy interfaces throughout your entire care network with no known transactional limits.

Automated site documentation, GUI-driven interface configurations, and support for a full spectrum of interoperability standards help you expedite integration and achieve excellence in interoperability.

Cloverleaf Wizard—Cloverleaf Wizard is a browser-based user experience that empowers less technical staff to build interfaces and onboard trading partners faster and easier while leveraging the power and reliability of Cloverleaf. Wizard users can build, deploy, edit, and test simple interface configurations with Wizard workflow and create or edit lookup tables or import a CSV file to create a table quickly. With the HL7 Variant Builder, a user can quickly modify segments, messages, and fields and enrich variants by testing sample data against the variants. Users can also stitch together interface configurations by leveraging objects built by more technical users.

Buildable Object Exchange—Easily migrate interfaces between Cloverleaf environments, such as from test to production, by creating a Buildable Object Exchange (BOX) with the GUI-driven BOX utility. A BOX contains all the artifacts (such as interface configurations, translations, HL7 variants, and scripts) needed for the interface to function.

Statistics database—Cloverleaf engine statistic information can be saved to an external database for reuse and reporting. This data is available through an API, viewable through Global Monitor, or available for your reporting, such as viewing server metrics and interface throughput for a specified time (e.g., number of messages processed in a month or average uptime for the previous week).

Database connectivity—Securely access and share data with industry-leading database management systems through JDBC connectivity, using GUI-driven database protocols. All JDBC-aware databases are supported with a single driver, giving users the ability to deliver faster performance and access or update your clinical data repositories and warehouses.

DICOM—The DICOM radiology standard is supported in Cloverleaf, allowing for bi-directional translation between DICOM and other Cloverleaf supported message formats (e.g., HL7 v2 to DICOM conversion) and can route DICOM transactions containing images. SCP and SCU network protocols are also supported.

Cloverleaf Open API—Extend the functionality of the Cloverleaf Integration Engine with an Open API, enabling users to work with specific interface components through standard RESTful API interoperability to provide increased flexibility and automation for the Cloverleaf platform.

Clovertech—Clovertech is our user community of over 4,000 registered users, available to all Cloverleaf users. This forum serves as a knowledge base for new and experienced Cloverleaf developers and users to ask questions, get answers from the community, and connect with their peers. Visit us at http://clovertech.infor.com

Infor Security Office Compliance—Ensuring healthcare data security is as important as the integration engine that powers it. Each release of Cloverleaf follows secure development processes with source code scanning, vulnerability and penetration tests, continuous support for new ciphers and algorithms. Oversight of these secure development processes is provided by the Infor Security Office, an internal, independent group charged with enforcing best practices.

Add-on components

Interoperability and development

Web Services—Quickly create connections with GUI-driven support for SOAP and RESTful consumer and provider connections. Full support for WS-Security and WSDL creation and parsing is included. Additionally, the Web Services Adapter can enable your legacy applications to use FHIR with limited to no additional application investment, without waiting for your vendors to become FHIR-enabled.

DIRECT Adapter (included with Web Services)—The Cloverleaf DIRECT Adapter connects Cloverleaf platforms with the clinical data from multiple EHR and EMR systems through Health Information Service Providers (HISP) to authenticate users and access. Connect your clinical staff to clinicians outside your facility to better coordinate care and clinicians to patients to improve patient engagement. Cloverleaf also monitors DIRECT mailboxes to receive and route inbound data and adheres to DIRECT protocol and security standards.

Collaboration and solutions

Message Warehouse—The Cloverleaf Message Warehouse automatically and seamlessly isolates selected data that passes through the Cloverleaf engine and stores these messages and metadata in an external database or data warehouse for secondary uses of data, including reporting and analytics. When you add Cloverleaf Message Warehouse, your Cloverleaf solution becomes an even more strategic resource to support operational and patient care excellence. You can share and collect data according to your specific needs to gain a clearer picture of your day-to-day operations.

IHE Adapter—The IHE Infrastructure Adapter supports universal data access and sharing to simplify your IHE efforts and help your organization reduce the cost of manually implementing IHE profiles throughout your healthcare organizations and applications. The IHE Adapter helps ensure compliance among any IHE-compliant systems through standards-based sharing and quickly bring non-IHE compliant applications into compliance. By accelerating your IHE efforts with samples to promptly start your implementations, you can leverage web services technology and your existing Cloverleaf investment for increased interface reusability and reduced integration costs.

Clinical Bridge—Clinical Bridge, powered by the Cloverleaf Integration Engine, quickly connects your electronic health record (EHR) to Infor Healthcare, connecting clinical and operational data securely and rapidly. This near-real-time integration enables you to reduce errors and exceptions, eliminate manual data entry and paperwork, streamline workflow, and reduce supply expense.

FHIR API Enablement

FHIR Bridge—Built on top of the Cloverleaf Integration Engine, Infor FHIR Bridge further extends Cloverleaf's FHIR support by providing a library of FHIR functions, configurations, and additional FHIR infrastructure components. Infor FHIR Bridge offers multiple interfaces and associated artifacts designed to enable users to integrate HL7 2.x systems to a FHIR server and receive FHIR formatted data and translate to HL7 v2.x. These interfaces cover several commonly used message events containing component translations for multiple segments and FHIR resources. These translations are written in a componentized way enabling customers to reuse component translations (e.g., the HL7 PID to FHIR Patient resource translation) for their own set of interfaces and events.

Cloverleaf API Gateway—An extension of the Infor Cloverleaf Integration Suite, the Cloverleaf API Gateway powered by Infor OS delivers a cost-effective solution for healthcare organizations looking to enable security, monitoring, and management of APIs (Application Program Interfaces), including those based on the HL7 FHIR standard, throughout their organization. By utilizing Cloverleaf API Gateway, healthcare organizations will be able to publish and update APIs more readily, help prevent denial of service attacks, and manage and monitor performance and utilization of APIs. When coupled with the Cloverleaf Integration Engine, the Cloverleaf API Gateway provides deep backend integration to enable legacy systems to participate in the API economy.

Cloverleaf Consolidator—Cloverleaf Consolidator is an efficient solution for aggregating critical clinical information from multiple sources to provide data access for FHIR enablement, data acquisition for health analytics, and aggregated clinical document exchange as a patient moves across the care continuum. With Cloverleaf Consolidator, you can retrieve the right information on demand—whenever needed—accelerate digital innovation and improve patient care while reducing costs.

Security and risk

Security Server—Fortify security at the server level with Security Server, a solution to facilitate HIPAA and ARRA readiness. By using Security Server, you can enable secure connectivity for Cloverleaf users with user and role-based Access Control List (ACL) configurations to restrict system access and eliminate accidental configuration changes. All user activity is logged so that you can track user behavior for possible security issues and export audit logs for consumption by Security Information and Event Management (SIEM) tools.

Secure Messenger—Enable security "on the wire" at the protocol level by protecting messages during the transmission process. Create a secure connection with any other secure-enabled endpoint, such as a web server, FTP server, or secure socket. Secure Messenger also includes support for the latest TLS encryption algorithms and ciphers.

Secure Courier—Deploy lightweight agents across multiple remote networks to send and receive data via a centralized Cloverleaf instance. Use Secure Courier to extend the Cloverleaf Integration Suite across the Internet into remote networks, providing a secure means of bi-directionally transmitting any healthcare data (such as demographic, clinical, financial, and operational) to your physician community or other entities. All configuration, management, and monitoring occur at the centralized instance, minimizing the IT footprint and resource requirements at the remote endpoints.

Integration management

Global Monitor—Global Monitor is the web-based and mobile application designed for developers, operations and support staff, managers, and analysts. Monitor all nodes, environments, and interfaces and proactively monitor interfaces, visually trace messages, and view engine statistics and reporting. With Global Monitor, you can manage your Cloverleaf environment through a single, web-based point of entry with real-time alerts and 24/7 monitoring to address data flow interruptions proactively, minimizing the effect of data transmission errors to improve patient safety. User and role-based security is included, with the ability to provide specific views of the environment to users or roles.

High availability—Cloverleaf can be deployed in resilient configurations to maximize your uptime. Use automatic detection and notification of hardware or operating system failure with automated failover to gain peace of mind by knowing that hardware problems will not impact processes, patient care, and revenue.

Cloud

Cloverleaf Cloud—Healthcare interoperability in the cloud has arrived. Infor Cloverleaf Cloud is purpose-built on Amazon Web Services (AWS) for healthcare organizations that want to transform their business for digital health. Infor Cloverleaf Cloud enables your team to make more connections and move data securely and realize the value of that data and those connections faster, all without the burden of managing infrastructure.

[1] Black Book™ 2020 Survey, Survey Period Q4 2019-Q3 2020, "Black Book 2020 #1 Clinical Data Interoperability Solution"
[2] Definitive Healthcare, "US Acute Care Market Share with 150+ beds as of January 2020 for Interface Engines"

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