The Healthcare Ecosystem - A Challenging Environment for Integration

The Healthcare industry is made up of a very diverse mix of systems – both legacy and new. Organizations have had to contend with a multitude of operating systems, databases, data formats and communication protocols that have accumulated within the healthcare ecosystem over the years. Much of the integration within healthcare involves data produced or consumed by EHR systems. From cloud solutions with modern APIs, to traditional HL7-based systems, to more closed custom systems – there are hundreds of EHRs active today, each posing their own challenges.

Legacy and New Systems Have to Coexist

In most cases, upgrading or replacing legacy systems to support new standards or technology simply isn't cost-effective or feasible. The reality is that organizations must be able to work around these constraints, supporting both the old and the new. Middleware that sits alongside these systems allows you to develop, innovate and connect on the technology that is currently in place. Middleware is what facilitates making these disparate, non-interoperable systems *interoperable*.

Middleware Connects Non-Interoperable Systems

The PilotFish eiPlatform integration engine is that middleware. It enables an organization to "loosely couple" all of its systems, connecting offerings from various vendors and of different ages and technologies. The result is flexibility and adaptability that is impossible to achieve by hard-coding integrations directly into each application.

PilotFish eiPlatform - Connect Anything With Anything

PilotFish middleware is being leveraged throughout the healthcare ecosystem – by payers, providers, equipment vendors, cloud services, exchanges and other entities who need to deliver "interop-capable" solutions. Using a simple, graphical interface "assembly line", implementers connect anything to anything – including legacy and new technology that may have been developed using different data models, designs or architecture. The eiPlatform is compatible with all major databases, operating systems, data formats and communication protocols. Additional benefits to be realized include:

- Dramatically lowering the total number of interfaces required between internal and external business applications by implementing a many-to-one and one-to-many (common model integration) method of managing interfaces.
- Rationalizing the configuration, management and execution of integrations into a consistent "assembly line" process, (regardless of the data formats or connectivity protocols involved) – thereby reducing the number of tools and technologies IT staff must master and maintain.
- Facilitating connectivity between systems and the aggregation and synthesis of data so that it can be standardized and readily consumed.
- Enabling the implementation of newer industry XML standards such as HL7 3.x , CCDA, CCD and FHIR immediately, while still supporting the older standards such as HL7 2.x, ANSI X12, CSV, XLS as well as the proprietaryformats of internal and external applications and services.

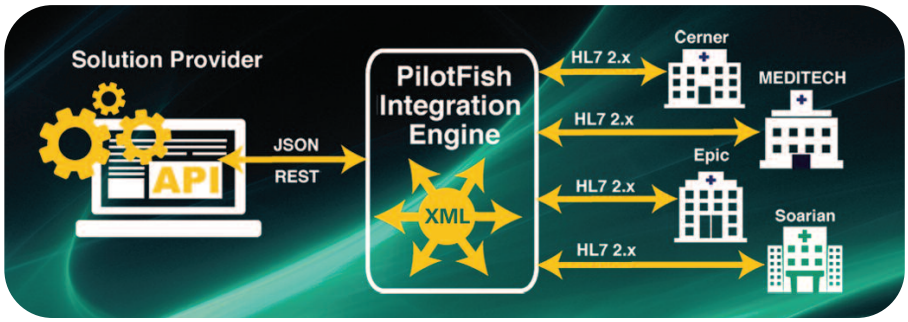
PilotFish - Facilitating Integration in Virtually Every Area of Healthcare

The healthcare industry is made up of a web of complex integration scenarios.

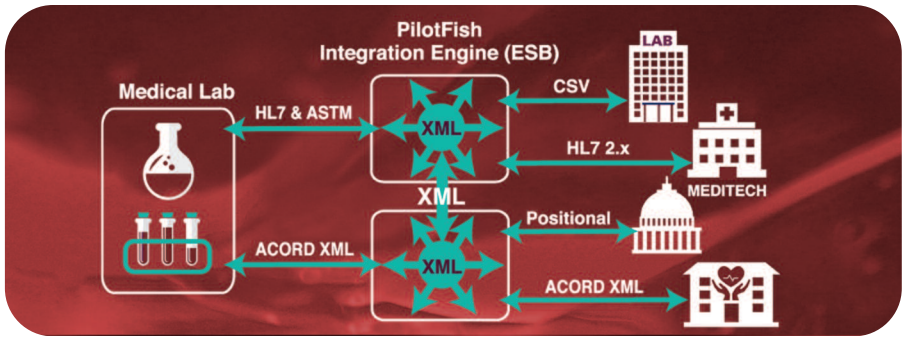
PilotFish meets the needs of solution providers, medical equipment and device manufacturers, medical labs, HIEs and others with an architecture that is both extensible (using open source components) and flexible enough to keep up with an evolving technology landscape and ever-changing requirements:

PilotFish meets these needs by utilizing:

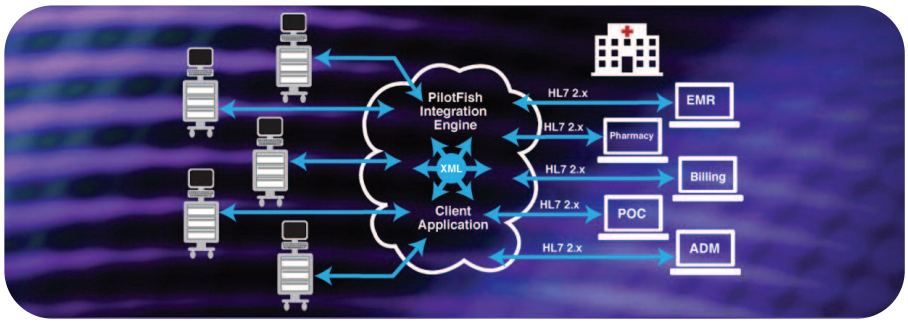
- A common model method of integration which compensates for systems not being natively interoperable by converting all data into a common XML standard. Once in a common format, it can be easily converted into the target's required format.
- Custom components that can seamlessly handle the differences in data formats, varying versions of standards and incompatibilities caused by customization or extension of standards.
- Format readers that can instantly read in and convert old and new formats – flat files, EDI, XLS, CSV, HL7, FHIR etc. into an XML representation that is readily mapped to the format required by a target system.
- Built-in adaptors that handle virtually any kind of connectivity requirement.
- An extensive library of Processors that provide a variety of quick-to-configure data manipulations, including compression, encryptions, validation and unstructured data handling.
- An open, extensible architecture that allows implementers to leverage a simple API to add modules to the base product on-the-fly using Java or .NET classes.
- A flexible deployment model with an engine that can be deployed in a lightweight container alongside a device, on single server, in a cluster, federated or in the cloud.



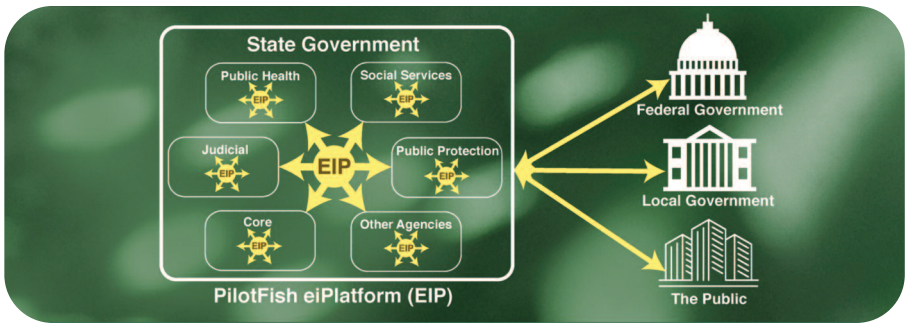
SOLUTION PROVIDER – Message delivery is critical when impacting patients and serving thousands of meals daily in acute care settings across the USA. PilotFish provides real-time integration with HL7-based EMRs and admissions, discharges, transfers and order changes for a leading food services provider with cloud-based food and nutrition management system.



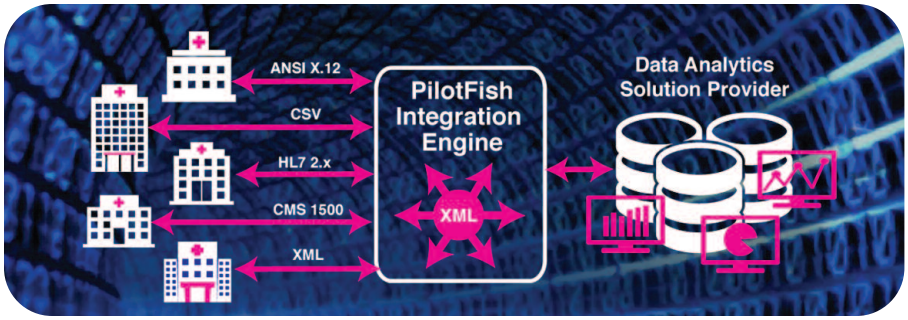
MEDICAL LAB – Medical lab with integrations with LIS systems implemented PilotFish as the central enterprise service bus and data transformation framework to simplify its integration architecture. PilotFish supports the diverse data formats requirements of client customers which include other labs, hospital EMRs, providers, Government agencies and payers.



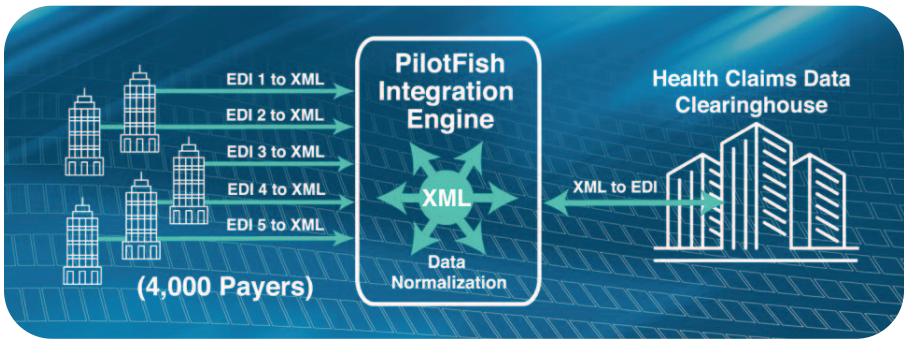
EQUIPMENT PROVIDER – Medical equipment provider for a geographically disparate set of Healthcare providers leverages PilotFish to support integration with all of their products, in any provider environment or part of the world. PilotFish is lightweight enough for deployment alongside any piece of equipment and flexible enough to handle a wide range of data formats including any flavor of HL7, IHE profiles, DICOM, XML, relational databases and anything else that their implementation teams may encounter.



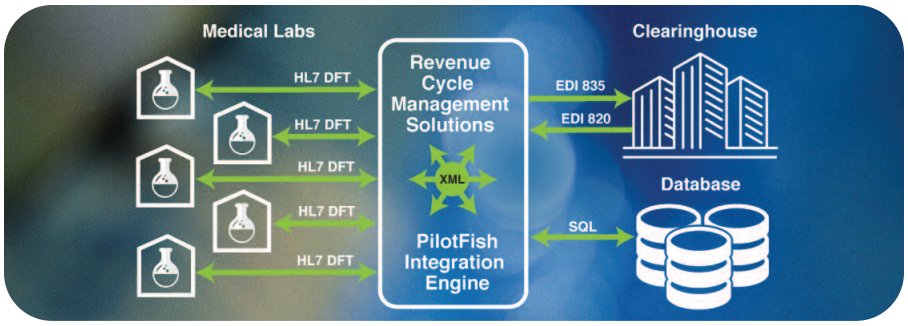
STATE GOVERNMENT – State Government leveraged PilotFish to set up a Federated Model for inter- and intra-agency integration. Pockets of rapid implementation have taken root without introducing the governance and change control overhead that a more bureaucratic, centralized approach would carry. Maintainability has been dramatically increased – PilotFish-trained IT staff can readily support interfaces built by anyone, in any agency.



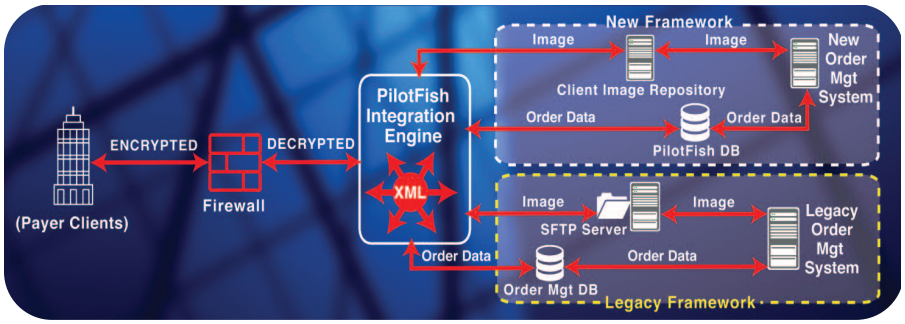
REPORTING & ANALYTICS – Data analytics firm leverages PilotFish for its architectural flexibility to adapt to the diverse data flavors and format requirements of its healthcare provider members. To support this, PilotFish offers a combination of out-of-the-box parsers, finely tuned custom components and the ability to work with any data format.



HIE – Healthcare Claims Clearinghouse and HIE utilized PilotFish to re-engineer and transition its claims processing architecture. PilotFish was used to create a framework capable of handling the connectivity, data manipulation and data validation required to effectively replace and enhance their legacy implementation. The effort included the implementation of several hundred unique data flows providing a secure gateway for the electronic exchange of data.



REVENUE CYCLE SOLUTIONS – Clinical laboratory billing and collection company leveraged PilotFish to initiate automation. By using PilotFish and decoupling interface logic from their core application, the client's conversion between claims processing systems became seamless. They configured interfaces to process binary image attachments that are embedded within HL7 messages as Base 64-encoded strings, eliminating the previous very manual effort.



CLINICAL LABORATORY – Clinical laboratory performs hundreds of thousands of tests every day and deals with huge volumes of data from many disparate systems. The lab leverages PilotFish to support real-time data integration and to ensure the integrity of the data from its very diverse client base.

PilotFish - A Future-Proof Solution That Grows With You and the Industry

PilotFish has been architected to provide the flexibility, extensibility and compatibilty your organization needs to keep up with a changing healthcare technology landscape:

- Flexible so you can expose both modern (e.g., web service) and legacy (e.g., file based) endpoints.
- Extensible in that all of the components that comprise the eiPlatform framework and deployed interfaces are written in Java and are easily configurable and extensible through open APIs.
- Compatible because PilotFish supports all of the popular application servers, operating systems and platforms, so it is certain to work within your IT infrastructure and may help reduce associated licensing costs.

W3C Standard Technology Natively Interoperable

The World Wide Web Consortium (W3C) was created in October 1994 to lead the Internet to its full potential by developing common protocols that promote its evolution and ensure interoperability. PilotFish is based on W3C standards technology, so you can be assured of an open and widely supported technology stack that will not be sunsetted or displaced. W3C standards technology is critical for implementing an interoperability framework as it facilitates the:

- Exchange of health information more efficiently.
- Communication of that information accurately, effectively and consistently.
- Improvement of the delivery of healthcare via interoperability.

W3C standards technology also allows you to benefit from a vast library of web resources and the ability to draw from a large pool of highly skilled developers worldwide.

Organizations in virtually every area of healthcare are benefitting from PilotFish. We invite you to learn more by visiting the case studies section on our website at: ***www.Healthcare.PilotFishTechnology.com***

PilotFish Product Specifications

SUPPORTED PLATFORMS
Windows
Linux / Unix / AIX / HP-UX
Mac OSX
SUPPORTED APPLICATION SERVERS
Windows Service
Apache Tomcat
JBoss / WildFly
WebSphere Application Server (WAS)
Glassfish
WebLogic
Any Other Java Container
SUPPORTED DATABASES
Any JDBC DB (MS SQL Server / Oracle / DB2 / Postgresql / MySQL / MariaDB / Java DB / Derby / H2)
MS Access
MongoDB
SUPPORTED FORMATS
HL7 2.x / 3.x / FHIR
CCD / CDA
EDI X12
Delimited and Fixed-Width Files (CSV/Positional/Custom)
Key / Value
XLS / XLSX
DICOM
XML
JSON
PDF
NCPDP
Binary (.wav / .jpg)
SUPPORTED PROTOCOLS
Database (JDBC)
Email (IMAP / POP3 / SMTP)
Local / Network File System
FTP / SFTP / FTPS
TCP / UDP Sockets
HL7 LLP
HTTP/S
OAuth2 (JWT / Token Introspection)
Messaging (JMS / MQ / MSMQ / RabbitMQ / Kafka)
EMR API Call
Web Services (SOAP / RESTful)
Command-Line Invocation (CLI)
Active Directory / LDAP
Custom Connectors
IoT (Serial / MQTT)
VistA RPC
AS2
Cloud Storage (S3 / Google / Azure)
ARCHITECTURE
Consistent "Assembly Line" Pattern
Configuration Over Code
Component Driven
Extensible Via Open APIs
Scripting Support (via GraalVM: JavaScript, Python, etc.)

HL7 FEATURES
HL7 Friendly Name Option
HL7 Lenient Parser
Ability to Read Any Version of HL7
Inline HL7 Documentation
Transaction Templates for HL7, FHIR and CDA
EDI X12 FEATURES
Parse any EDI X12 Transaction
EDI Friendly Name Option
SNIP Validation 1-3 Included, 4-7 Available
Inline Code Set Definitions
Transaction Templates for EDI
DATA TRANSFORMATIONS
Graphical, Drag & Drop Data Mapping
No Coding or Custom Scripting Required
Standards Compliant (W3C XSLT)
Computationally Complete
WORKFLOW PATTERNS SUPPORT
Sequencing
Splitting / Merging
Process Orchestration
Branching
Conditional Logic
Iteration
ERROR HANDLING
Easy, Hook-Based Customized Error Handling
Configurable Text-Based Logging
Flexible Proactive Notifications
Extensive Operational Visibility Framework
VALIDATION
Schema (XSD)
Structural Format Conformance (HL7, EDI, etc.)
Business Rules
External Lookups
TESTING
Instant (No Compilation or Deployment)
Graphical, Step-By-Step Debugging
End-to-End or Stage-by-Stage
IDE-Resident Server Emulation
ANALYTICS
Robust Real-Time REST API
Flexible Reporting
On-the-Fly Break-Fix
eiDashboard Multi-Instance Monitoring
Splunk Integration
DEPLOYMENT MODELS
On-Premises
AWS / GCE / Azure
Lightweight / Bundled
Docker / Containerization
LICENSING *(Includes an unlimited number of dev, test & cold back up)*
End-User Licenses
Product Bundling Licenses
Value Added Reseller Licenses
One-Time Licenses
Subscription – Flat Monthly or On-Demand Pricing

www.Healthcare.PilotFishTechnology.com

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