

MD Link Integration



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The MD Link Integration Strategy

MD Link is a unique and innovative platform for integrating multiple heterogeneous systems. System integrators can use MD Link to create custom, process-oriented interfaces that can be run on virtually any computing platform.

MD Link's integration strategy can be summed up as:

- Support the widest-possible range of data, application and network standards with Java technology
- Easy-to-use data mapping tools leverage transformational power of XML
- Process-oriented Interfaces support complex detailed business logic
- Plug-in architecture supports custom development of visual Interfaces for legacy systems
- Design Studio requires no Server for testing and debugging
- Interface-based licensing reduces cost for small to medium implementations
- Processes can be distributed across the network, so that processing is performed closest to the user or data



Java technology for portability, compatibility and security

MD Link Studio and Server are based on the Java 2 Standard Edition and support almost any operating system, without the need for complex and expensive Enterprise Servers.

Interface Adapters are Java plug-ins that support Visual Mapping of Event, Task and Resource input. Custom Plugins can implement any proprietary or open-source Java library.

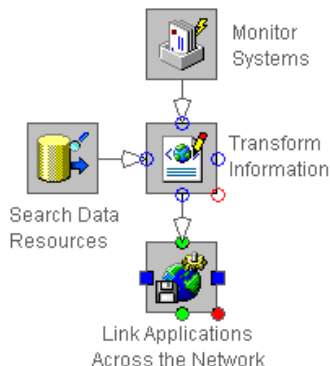
At run-time, these plug-ins generate XSLT templates for powerful transformation of content and structure of almost any data type.



Leverage XML for Industry Standard Data Transformation

XML is the industry standard language for data interchange. MD Link Adapters exchange data automatically as XML and use XSLT templates for content and structural transformation of any type of documents.

The visual Design Studio hides the complexity of XML, while supporting advanced XSLT template customization. A wide range of XPath functions support text, math, date and other specialized data conversion requirements.



Easy to Design Process-Oriented Interfaces

System-to-interfaces are usually more than simple point-to-point queues of data feeds. MD Link supports complex processes that extend the definition of the term "Interface" to mean "create your own process-oriented interface".

To create fully functional business interfaces, you need to create multi-tasking processes that have many steps. MD Link's Event-driven any-to-any Task Mapping model lets you create complex solutions to Interface problems.



MD Link Development Cycle

MD Link supports a role-based, cyclical development model. Designers create Interfaces and Processes. Managers deploy Processes and run Services. Users monitor Services and Transactions. Auditors verify transaction output against Interface definitions. If changes are required, the Designer can implement them.

Interfaces



Interfaces are the customized mapping of data, application and network resources. MD Link's growing list of Interface adapters provide visual customization and data mapping. (See Interface Adapters)

Processes



Processes link Event, Task and Resource Interfaces to create active solution Services. (See Design Studio)

Services

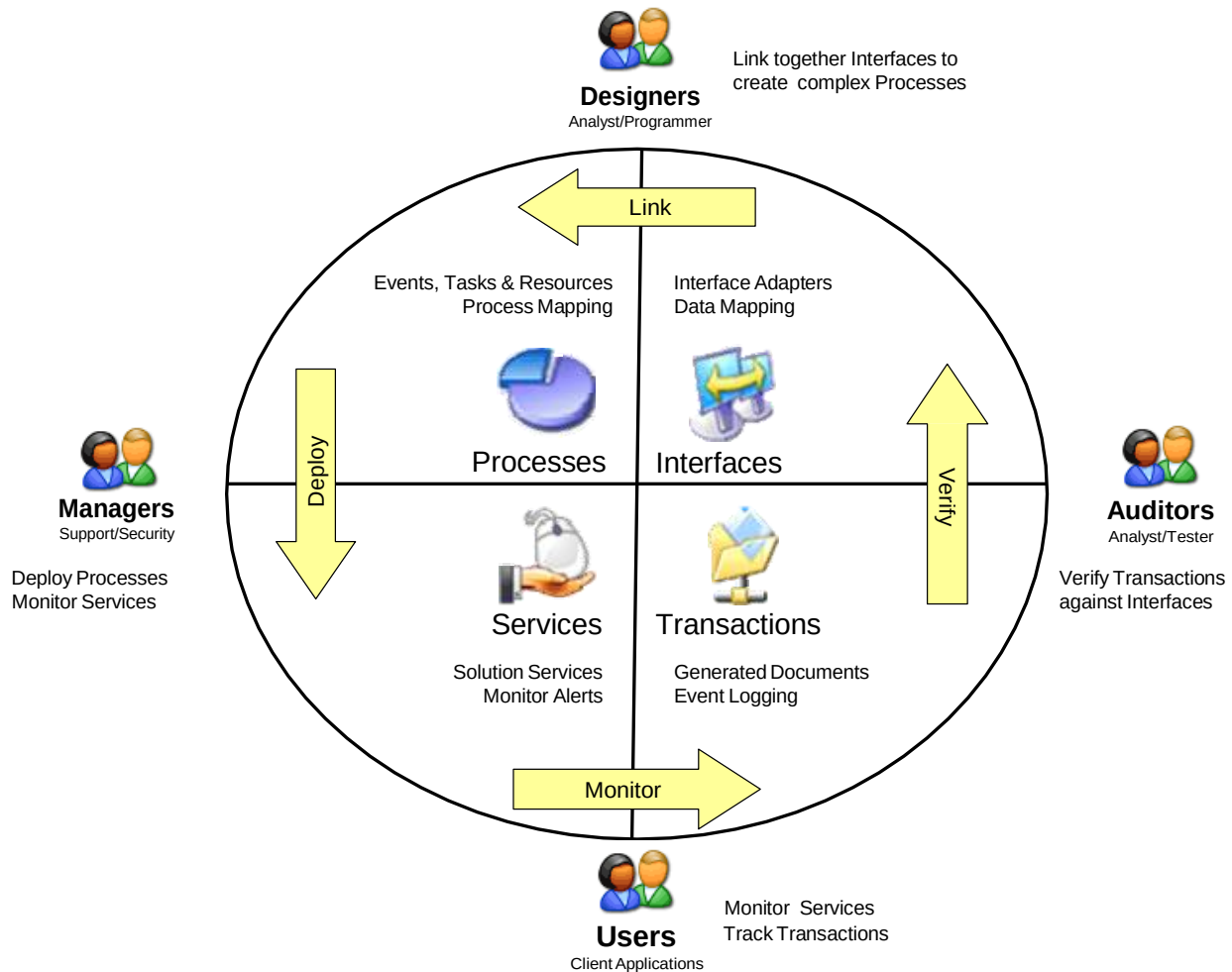


Services are processes that can be hosted on any server. Services monitor Interface status and Transactions activity. (See Server Console)

Transactions



Transactions are Service requests that can generate documents, messages and database updates. (See Server Console)





MD Link Design Studio

The MD Link Designer Studio lets Designers (Programmers and/or Analysts) create visual interface mapping solutions. The result is a Process that can run as a Monitored Service and generate Transaction Logs.

Events, Tasks and Resources

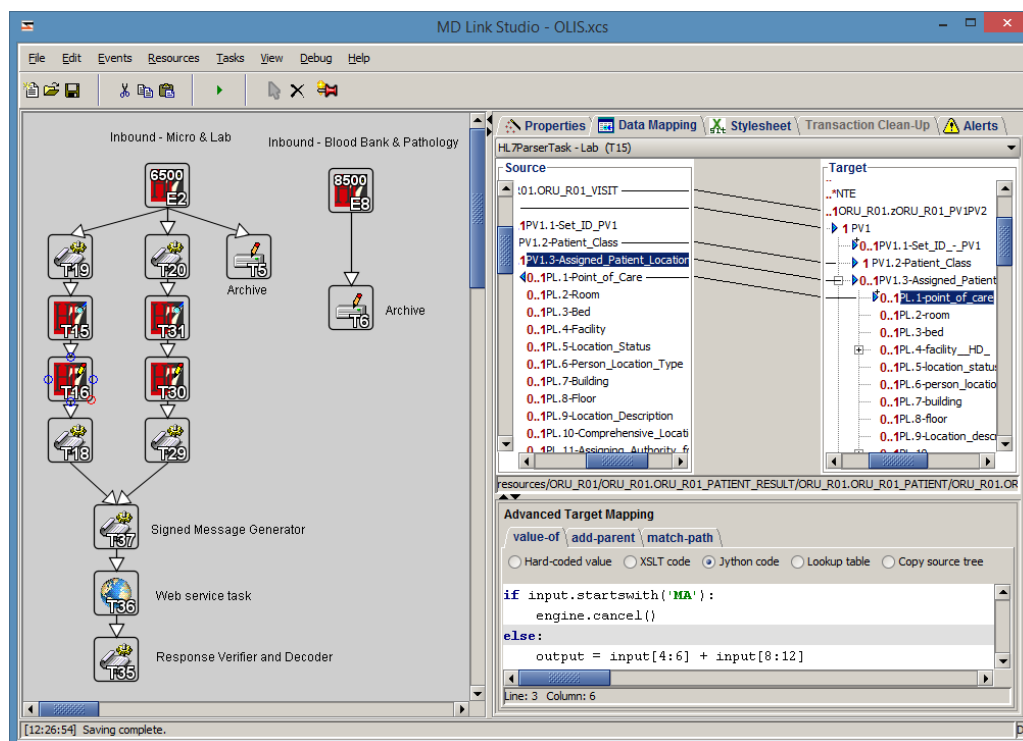
All types of Interface Adapters can be customized to point to data sources, schema definitions and metadata. Events monitor data resources and act as application "listeners" that invoke a Process. Tasks are specialized functions for accessing data, mapping and conversion, linked together to form complex transaction interfaces. Resources access static reference information and default values for inclusion into a Task. Error information and working data can be passed to an error-handling process, which can send email or text alerts. Processes always start with an Event, such as a new file in a folder or message in a queue. The incoming Event data record is passed to a series of linked Tasks, all of which can access diverse sources of information.

Data Mapping

All types of Tasks have a visual mapping screen for drag-and-drop mapping of source data to target data. Any Task can be linked to any other Task type, resulting in a common mapping view and unlimited combinations of Interfaces can be achieved. The Advanced Target Mapping window on the bottom-right, supports custom coded XSLT templates, as well as text, date and math functions.

Debugging

The Design Studio has a dedicated Console (Server not required) for running solutions and displaying Log records. Logging levels settings can filter out debug and warning messages, so you can track the output. The Studio Console lets designers check XML and XSLT templates during testing.





MD Link Server Console

Process Services

MD Link Processes are saved by the Design Studio as XML solution files containing all the Interface definitions. The MD Link Server can load these XML solution files and run the Process as an active solution Service. While it is running, it will accept data via Event, and then transform the data via XML templates.

Process Monitor

While the Process is running the Monitor displays the color-coded status of each Interface in a Process. Each Interface shows latest activity and will turn yellow for warnings, and red for errors, such as network trouble. Each interface can be paused and resumed by a Manager.

Transaction Log

As each Event and Task executes in sequence, Log records are generated that show informational, warning, error and debug information. The level of details can be set, depending on debugging and performance objectives.

The screenshot shows the MD Link Monitor application window. The left pane displays a tree view of the solution file 'EpicADT Set 02.xcs - SOLN2' with various components like '001 Inbound - EpicADT', '001 Outbound - ICU AD', '001 Outbound - Merge', '001 Outbound - Muse N', '001 Outbound - SCM A', '001 Outbound - SIS Mu', '001 Outbound - eCHN', '008 ICU ADT Filter - T2', '008 ICU ADT HL7Parse', '008 ICU ADT HL7XPass', '008 ICU ADT HL7Xlate', and '009 Merge Filter - T24'. The right pane shows the 'Summary' tab with a table of log entries. The table has columns for Log Level, Time, Component ID, Component Name, Transaction ID, and Queue Element ID. The log entries show a sequence of INFO messages for various components, followed by two WARN messages. The details pane at the bottom shows the details for the selected log entry: Component Name: 012c SCM ADT Filter, Component ID: T67, Transaction ID: TRANS0, Time: 2014-11-25 13:32:56.599, Log Level: INFO, and Details: 'Run' script (line 27) chose to cancel branch.'

Log Level	Time	Component ID	Component Name	Transaction ID	Queue Element ID
INFO	2014-11-25 13:32:56.603	T48	010 Muse HL7Xl...	TRANS0	QELMID-TRANS0-E2-T46-0-T4...
INFO	2014-11-25 13:32:56.602	T48	010 Muse HL7Xl...	TRANS0	QELMID-TRANS0-E2-T46-0-T4...
INFO	2014-11-25 13:32:56.599	T67	012c SCM ADT ...	TRANS0	QELMID-TRANS0-E2-T63-0-T67
INFO	2014-11-25 13:32:56.598	T36	011b SIS Filter	TRANS0	QELMID-TRANS0-E2-T36
INFO	2014-11-25 13:32:56.597	T27	008 ICU ADT Filter	TRANS0	QELMID-TRANS0-E2-T27
INFO	2014-11-25 13:32:56.597	T67	012c SCM ADT ...	TRANS0	QELMID-TRANS0-E2-T63-0-T67
INFO	2014-11-25 13:32:56.596	T24	009 Merge Filter	TRANS0	QELMID-TRANS0-E2-T24
INFO	2014-11-25 13:32:56.596	T46	010 Muse Filter	TRANS0	QELMID-TRANS0-E2-T46
INFO	2014-11-25 13:32:56.595	T31	011a SIS Filter	TRANS0	QELMID-TRANS0-E2-T31
INFO	2014-11-25 13:32:56.594	T50	012b SCM ADT ...	TRANS0	QELMID-TRANS0-E2-T63-0-T50
INFO	2014-11-25 13:32:56.593	T33	011a SIS HL7Xlate	TRANS0	QELMID-TRANS0-E2-T31-0-T3...
INFO	2014-11-25 13:32:56.592	T48	010 Muse HL7Xl...	TRANS0	QELMID-TRANS0-E2-T46-0-T4...
WARN	2014-11-25 13:32:56.584	T33	011a SIS HL7Xlate	TRANS0	QELMID-TRANS0-E2-T31-0-T3...
WARN	2014-11-25 13:32:56.583	T48	010 Muse HL7Xl...	TRANS0	QELMID-TRANS0-E2-T46-0-T4...

Component Name: 012c SCM ADT Filter
Component ID: T67
Transaction ID: TRANS0
Time: 2014-11-25 13:32:56.599
Log Level: INFO
Details: 'Run' script (line 27) chose to cancel branch.'



Interface Adapters

Interface Adapters provide drag-and-drop access to a variety of data, application and communication protocols. The plug-in Java programs provide a graphical representation of each interface's unique properties and data structure. The input or output from any data source can be linked together, offering unlimited possibilities for creating customized integration solutions. Simply drop these plug-ins into the MD Link Studio and begin creating customized integration processes. Developers can create custom Interface Adapters using Java or JPython scripting languages.

 HL7 Protocol	Health Level 7 Protocol (HL7) • Parse & Generate HL7 2.X messages • Parse, Generate HL7 3.0 XML • Send and Receive HL7 over TCP/IP or Web Services	 File Transfer	Remote File Transfer • Send Data Files using File Transfer Protocol • Exchange Files between Remote Systems
 Database	Database Management Systems • Interface any Relational Databases • Structured Query Language (SQL)	 Messaging	Messaging Systems • Exchange Data with Message-Oriented Middleware (MOM) Applications • Java Message Service (JMS)
 XML	XML Documents • Parse, Generate and Serialize XML • XML Schema Definition (XSD) • Document Type Declarations (DTD)	 Text Files	Formatted Text Files • Design, Parse and Generate Text Files • Fixed or Delimited Fields • Hierarchical Record Matching
 Web Services	Web Services • Send data to any web application through standard web methods or SOAP.	 TCP Sender	Generic TCP Sender Task • Define your own TCP-based protocol to communicate with unique legacy systems
 E-Mail	Electronic Mail • Simple Mail Transfer Protocol (SMTP) • Post Office Protocol (POP) • Dynamic Message Content	 Shell Task	Shell Task • Invoke other applications on your machine • Utilize third-party documentation conversion software
 Monitor Files	File Monitoring • Monitor Folders for New or Changed Files • Load Documents into Solution for Processing	 Custom Script	Custom Scripting • Define Customized Tasks using Python Scripting Language • Utilize 3rd party Java Libraries for Extended Functionality



Integration Scenarios

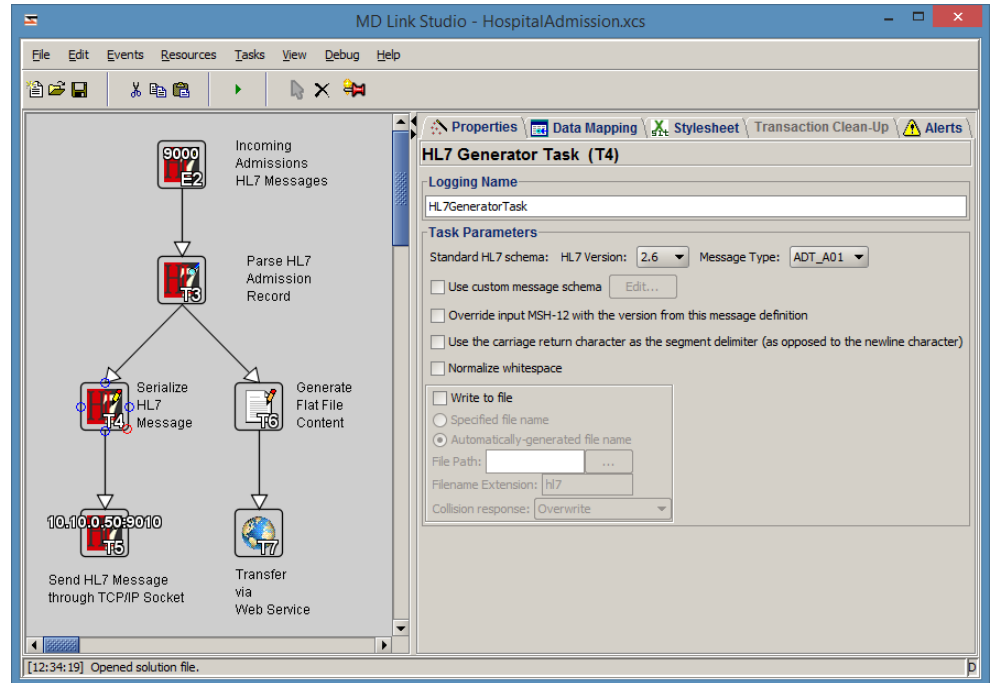
Scenario 1: Health Level 7 (HL7) Patient Admission Interface to Nursing

This scenario shows how to receive, parse, generate and send HL7 messages. An Admissions message queue is monitored using the HL7 Socket Event. The message is parsed, then a Nursing HL7 record is generated. Finally, an HL7 Socket message sends the converted Admission record to a Nursing System.

The HL7 Generator Task's Customizer shows:

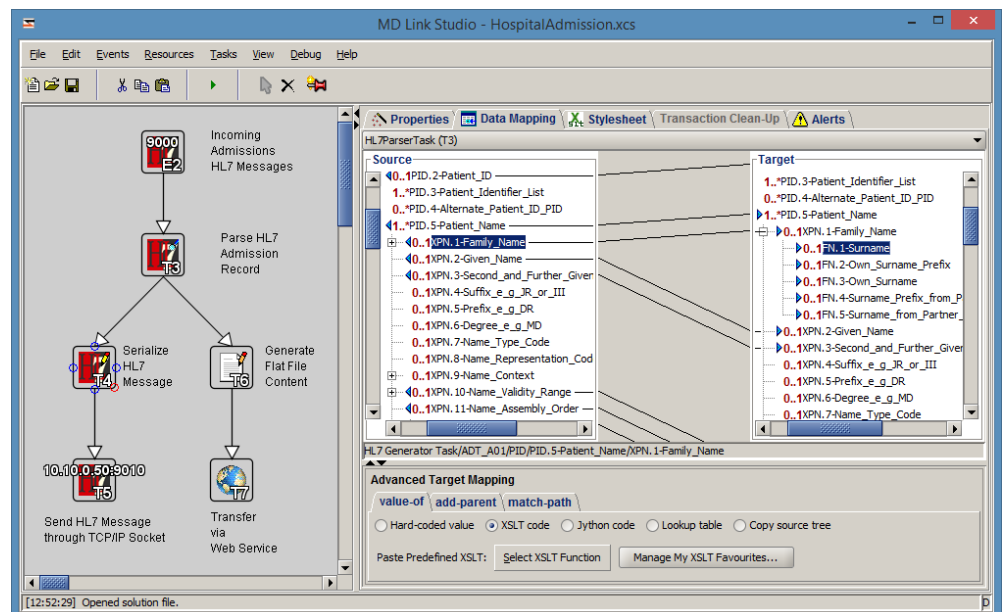
- HL7 Message Version
- HL7 Message Type
- Not using a Customized Message
- Writing to a local folder

The process also shows a proprietary format EDI text file written and sent to another system via File Transfer Protocol (FTP).



The HL7 Generator Task's Data Mapping window shows:

- Source is A01 (Admission)
- Target is also A01 (Nursing)
- The Advanced Target Mapping is converting last name to upper-case characters. This is an example of using XPath function.



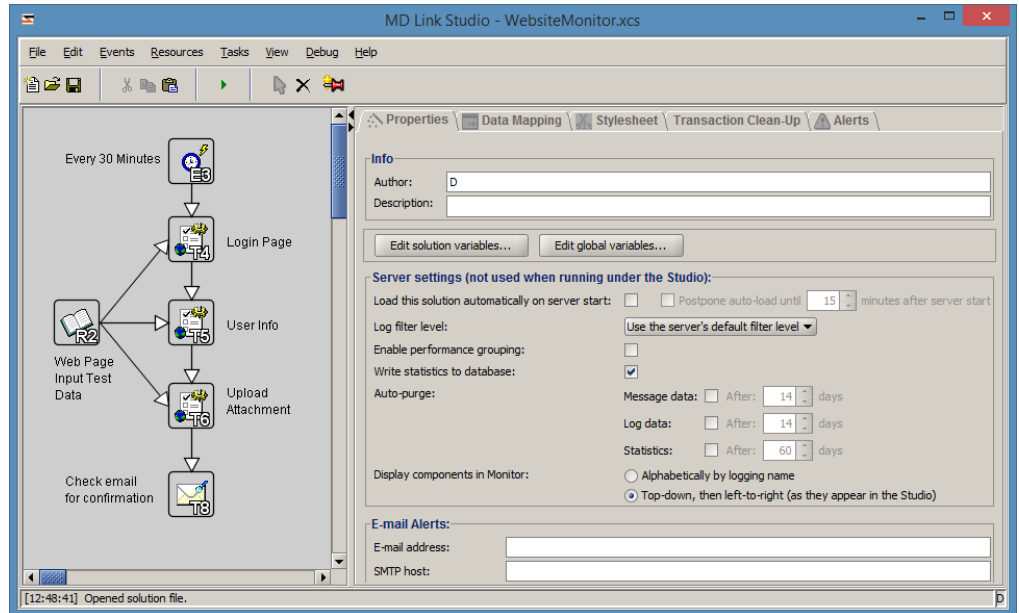
Scenario 2: Website Monitor and Alerts

This scenario shows how MD Link can interface with other systems via web pages, using the HTTP Post Task. In the scenario shown, a Timer Event triggers a form post and attachment upload to a website. After waiting for an email, the solution can send a text message if an error occurs on any Task.

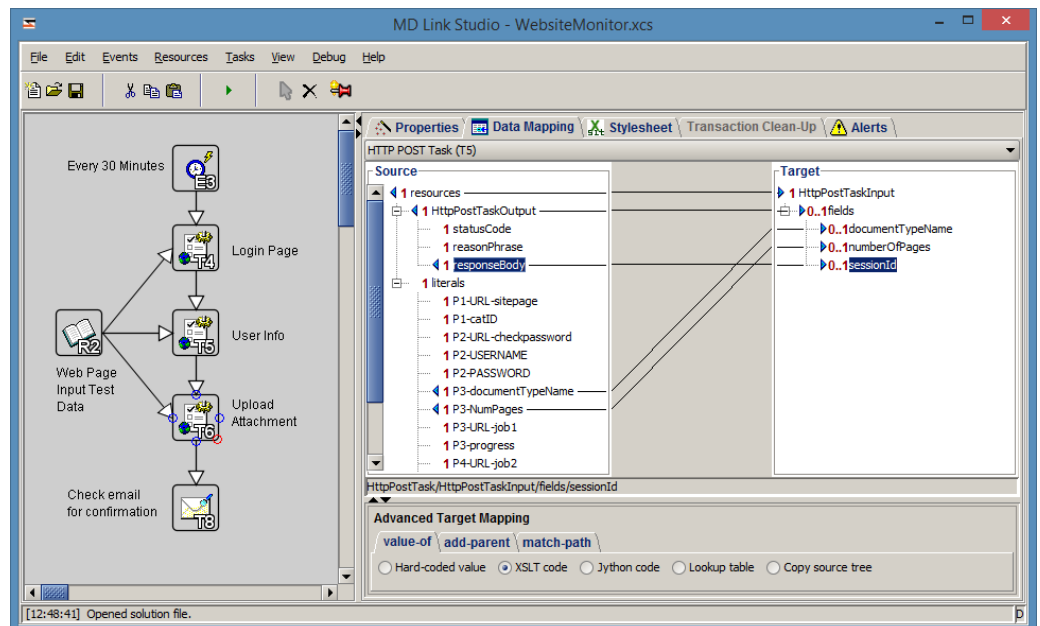
The “Upload Attachment” HTTP Post Task is highlighted.

This process illustrates:

- How to create a “Monitoring” process using Interfaces
- Interface Data can be passed from one Task to another
- How Text Messages can be sent on a Task failure (example: web-site is not responding)



- The Data Mapping panel show the session ID passed from the previous task
- Both Task and Resource (literal values) are on the Source (left) and the Target (right).





Product Summary

MD Link is unique and innovative software for integrating heterogeneous systems by creating Java-based software “services” that enable an enterprise’s data, application and network resources.

About MDI Solutions

MDI Solutions offers a complete range of outsourced data integration and interfacing services to the healthcare industry. Data integration and systems interfacing provide a strategic foundation of interconnectivity, as healthcare systems strive to make better use of information technology. A strong integration infrastructure, based on qualified, professional resources that develop, manage and continually support it, is an invaluable asset to all healthcare organizations.

MDI Solutions is committed to using leading-edge information technology for the ultimate purpose of improving patient care in our healthcare system. We offer outsourced services, develop and deploy data integration products that enable interoperability between systems.

Organizations large and small create and interact with billions of bytes of data on a daily basis. MDI Solutions respects the critical nature of healthcare data. Our services make patient information available to providers and decision-makers when needed, while maintaining the highest levels of data security and integrity.

Integration is defined as forming, coordinating, or blending into a unified whole. MDI Solutions specializes in seamlessly enabling disparate applications to communicate and work together through accepted, industry-standard mechanisms. Our technical staff is proficient with interfacing protocols such as HL7 and XML.

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