



Forensic Information Data Exchange (FIDEX)

Implementation Guide

2008-IJ-CX-K405

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The NFSTC is pleased to submit this Implementation Guide to the **United States Department of Justice, Office of Justice Programs, National Institute of Justice.**

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FIDEX Implementation Guide

FIDEX Overview

The Forensic Information Data Exchange (FIDEX), which is based on the National Information Exchange Model (NIEM), paves the way for forensic investigative, evidentiary and prosecutorial information sharing among law enforcement, crime laboratories and the courts. FIDEX complements the efforts of the Global Justice Information Sharing Initiative (Global) and provides a systematic approach for exchanging forensic data produced through local, State, and national criminal justice information-sharing initiatives. FIDEX also provides a uniform approach to developing an efficient system for the rapid access query of forensic data and information.

The FIDEX project was funded through cooperative agreement number 2008-IJ-CX-K405 between the National Institute of Justice (NIJ) and the National Forensic Science Technology Center (NFSTC). The main project objective was to provide a modular, portable, NIEM-conformant, reusable XML data format, along with supporting documentation, to criminal justice agencies wishing to share forensic information and data electronically.

Purpose of Implementation Guide

The purpose of this guide is to assist agencies considering a FIDEX implementation by providing guidance on business and technical issues. It has been developed based on our experiences implementing FIDEX in two pilot sites. This guide provides a quick reference for information about the main elements needed to implement this technology by an experienced IT department. It provides a brief description of the FIDEX data exchanges, where the exchange

information can be downloaded, and a description of the FIDEX portal capabilities. The FIDEX Implementation Guide contains information about the following topics:

- FIDEX Platform
- Web-based Portal
- Business Considerations
- Technology Considerations
- Technical Requirements

FIDEX Deliverables

The FIDEX project has culminated in two key deliverables that may be used independently or in conjunction with each other. The FIDEX deliverables are designed to provide two data exchange components and a portal application that supports the exchanges.

Information Exchange Package Documentation (IEPD)

The two IEPDs provide a national specification for standardized data exchange in systems that communicate with the crime laboratory and their laboratory information management system (LIMS), if available. The specifications can be downloaded from <http://www.it.ojp.gov/framesets/iepd-clearinghouse-noClose.htm>. These IEPDs have been developed using the National Information Exchange Model (NIEM), version 2.0, and include the XML schema, sample documents showing how an examination request or disposition might be represented using the specifications and documentation for how to implement the IEPDs. These IEPDs may be implemented on a stand-alone basis or in conjunction with the FIDEX platform described later in this report.

Forensic Case Submission

This IEPD is intended to replace the current paper-based “long-form,” which many agencies use to request examinations on evidence. The IEPD is designed to allow the agency to transmit details about the incident, the evidence and examinations requested on that evidence.

Forensic Case Disposition

This IEPD was developed based on the observation that crime laboratories often do not receive case disposition information. The Forensic Case Disposition IEPD is intended to be implemented between either a prosecutor case management system or a court case management system and the crime laboratory. It is triggered when the case disposition status has changed. This disposition information will be received by the crime laboratory and may be used as the basis for determining whether outstanding examinations can be cancelled and removed from the backlog of cases.

FIDEX Web-Based Portal

The FIDEX Web-based portal acts as a central hub to support information exchange and implementation of the IEPDs. It was developed to be highly configurable and to be used across a variety of different business and technical scenarios. The portal is packaged as a Web-based application that can store and present case- and examination-related information across multiple screens. These windows include:

Case Summary

Case Summary Evidence (12) Subject/Victim Case Parties Scheduled Events (1) Activities

Summary Case Information:

Request Date/Time: Jan 11, 2010, 0:23
 LEA Incident Number: 090233993
 Crime Lab Case Number:
 Requesting Agency: BPD

Incident Information

Incident Date: 2009-05-01
 Incident Location: ##### Hill Avenue
 Offense Code: Shots Fired
 Offense Description: At the direction of Sgt ##### photographed the scene of Shots fired.
 Note(s):
 District/Unit:

Court Case Information

Court Case Number:
 Case Status:
 Dismissal Status:

Other Information

The Case Summary window provides information about the incident including the date and time, location, associated offense code(s) and an offense description. Additionally, the screen may contain information about the court case and the status of that case. When integrated with external systems, this information may be imported.

Evidence

Case Summary Evidence Subject/Victim Case Parties Scheduled Events (1) Activities

Row Nbr.	LEA ID	CL ID	Type	Collected From	Container	Description
1			Photograph	crime scene		A the direction of Sgt ##### look photographs of the scene of Shot fired.
2			Firearms	crime scene		9 Casings marked by cones 1 thru 9, collected by PO Carnes from ##### Ave near #197.
3			Firearms	crime scene		3 projectiles marked by cones 10, 11, 12, collected by PO ##### from ##### Avenue near #197.
4			Latent Prints	suspect		26 Major Case print photographs.
5			Clothing	other		1 gray clored sweatshirt (zipper) recovered from A Ford Expedition gray in color owner #####
6			Clothing	other		1 Red and Black baseball hat.
7			Document	other		1 N-Star bill in the name of ##### Avenue, Dorchester
8				other		see above
9			Vehicle	victim		1 Mass License Plate # ##### with two bullet holes, taken from victims car
10				suspect		2 p/b
11			Latent Prints	other		CD of seventeen (17) images of six (6) latent prints 8A, B, C, from item 8 and 8-1A, B, C from item 8-1

The Evidence window itemizes all evidence associated with a case and any examinations that have been requested on the evidence. Investigators use this screen to request examinations and to check the current status of an examination. Crime laboratory analysts use this screen to update an examination and to indicate assignment and the status of completion. The evidence associated with the case is typically imported from a records management system (RMS) or a

third-party evidence management system (EMS). Items of evidence are assigned a unique laboratory or police item identifier and are displayed above with a grey background.

Examinations are indicated with a yellow-highlighted background. The screen indicates the discipline, service requested and any special instructions, and assignment and completion information.

Suspect/Victim

Case Summary Evidence (12) **Subject/Victim** Case Parties Scheduled Events (1) Activities

Subject Information:

Row	Full Name	Sex	Date of Birth	In Custody	Booking Number
1	Gregory KNIGHT	M	1982-5-16	<input type="checkbox"/>	20090382102

Update Subject(s) Add Subject

Victim Information:

Row	Full Name	Sex	Date of Birth
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Update Victim(s) Add Victim

The Suspect/Victim window lists the suspects and victims associated with the case. This field includes the suspect’s name and other key identifiers such as date of birth and the booking number, if applicable. This information may be imported from a jail booking system or an RMS.

Case Parties

Case Summary Evidence (12) Subject/Victim **Case Parties** Scheduled Events (1) Activities

Involvement	Name/Contact Information	Address
Case Officer	Name: Aaron Gorrell Employment ID: Phone: 719.244.3322 E-Mail: ag.gorrell@yahoo.com	Address: 1433 Main Street City, USA 10293
Law Enforcement Representative	Name: Aaron Gorrell Phone: 719.244.3322 E-Mail: ag.gorrell@yahoo.com	Address: 1433 Main Street City, USA 10293
Primary Investigator	Name: Tina Ayala Phone: 623-932-1581 E-Mail: Tina.Ayala@phoenix.gov	Address: 2670 S. 158th Drive

Analyst

The Case Parties window provides a central list of the investigators, analysts and prosecutors who are involved in the case and should be permitted access to the FIDEX record. It includes name, role in the case and contact information. Other interested parties may be added or removed through this screen.

Scheduled Events

Case Summary				Evidence (12)				Subject/Victim				Case Parties				Scheduled Events				Activities			
Action	Event Date				Event Name				Event Description														
X	2010-01-06				Pre Trial Hearing																		

The Scheduled Events window provides a virtual calendar that lists critical dates, such as upcoming court dates, and can be used to help prioritize examinations. This scheduling information may be imported from a prosecutor case management system or a court case management system.

Activities

Case Summary				Evidence (12)				Subject/Victim				Case Parties				Scheduled Events (1)				Activities			
Event Date		Event Name		Event Description																			
2010-04-25 21:05:48.017	Submission Viewed	User: Gorrell, Aaron																					
2010-04-14 10:51:48.25	Submission Viewed	User: Gorrell, Aaron																					
2010-02-16 10:25:43.627	Submission Viewed	User: Gorrell, Aaron																					
2010-01-11 12:23:02.843	Submission Activated	User: Gorrell, Aaron																					
2010-01-11 12:22:14.407	Submission Viewed	User: Gorrell, Aaron																					
2010-01-11 12:15:50.75	Submission Viewed	User: Gorrell, Aaron																					
2010-01-11 12:08:53.627	Submission Activated	User: Gorrell, Aaron																					
2010-01-11 12:08:41.687	Submission Viewed	User: Gorrell, Aaron																					
2010-01-07 11:30:00.92	Examination Added	Ayalá, Tina added by Gorrell, Aaron																					
2010-01-07 11:30:00.687	Examination Added																						
2010-01-07 11:29:15.703	Interested Party Added																						

The Activities window provides a comprehensive audit trail of anyone who has accessed or updated the FIDEX record. The field that was updated is indicated, as well as the change that was made.

Implementation Considerations

Before implementing any aspect of the FIDEX platform, agencies should consider the business and technical ramifications. The next two sections provide recommended guidelines for agencies to perform this review and assessment.

Business Considerations

Implementing FIDEX will have a significant and immediate impact on the business process for investigators and the forensic crime laboratory. As such, a number of considerations should be taken into account.

Gap Analysis

In performing a gap analysis, agencies first document their current “as-is” business process. This documentation should capture the points at which organizations share case information, both formally (e.g., long form) and informally (e.g., e-mails/faxes/phone calls), and what information is shared at each of these points. Then after thoroughly reviewing the FIDEX application and understanding its capabilities, agencies should develop “to-be” models that reflect their updated business process using FIDEX. The intent of this exercise is to identify necessary changes to the agency’s business process and to identify any necessary modifications to the FIDEX platform.

Scope of Integration

FIDEX has been designed as an open system that allows agencies to develop custom code and integrate FIDEX with external systems. At a minimum, agencies that determine there is a benefit should consider the following issues:

- **Common Identifier:** The system analyst should determine common identifiers that can be used across all systems. For example, the Boston Police Department pilot site uses the agency Case Number to integrate information from multiple systems.
- **Case Update:** This issue helps determine how updates to the case will be communicated to FIDEX. Web-enabled case management systems should be able to push changes to the case or evidence to the FIDEX portal in real time. Unfortunately, most RMS/evidence software is not sophisticated enough to permit this model. As such, FIDEX can be configured to request case information any time the FIDEX record is accessed or on a pre-scheduled basis (e.g., every 24 hours).

Multi-Agency Portal Access

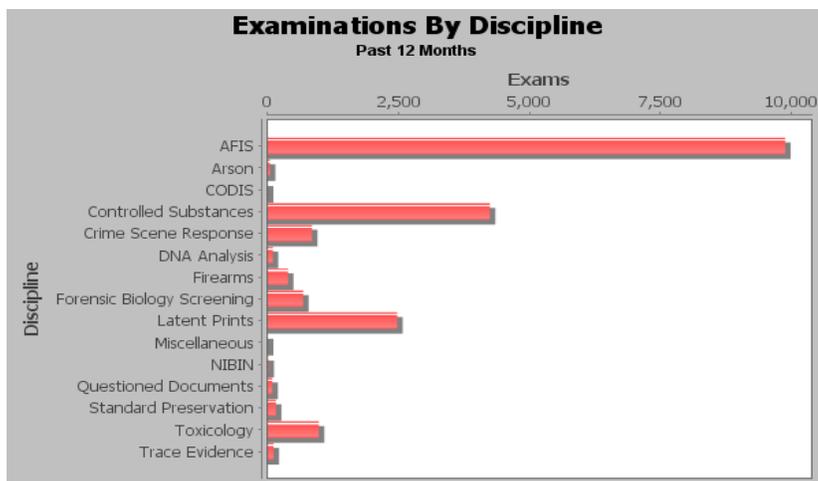
Agencies often experience unanticipated consequences when information is suddenly available to a broader audience. For example, some agencies are concerned that if prosecutors are given access to FIDEX, an inexperienced prosecutor might request unnecessary examinations. Agencies intending to permit prosecutors to access FIDEX should consider this scenario and develop a supervisory approval process before examination requests are submitted.

Greater access to information usually leads to better decisions. For example in one FIDEX pilot site, analysts receive an automated alert any time evidence is added or updated on an assigned case. In some situations, this new evidence had greater probative value and caused the coordinator to adjust the examination strategy. Likewise, with real-time access to the status of pending examinations, prosecutors can better schedule their case plan to reflect the expected completion dates.

Management Reporting

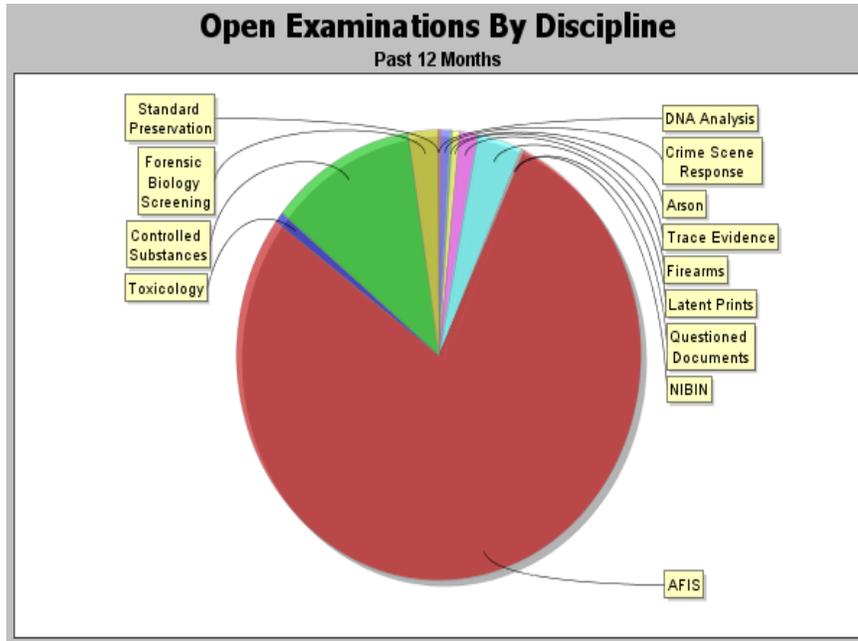
One of the greatest benefits of implementing FIDEX is its ability to aggregate information and provide administrators with the ability to measure the performance of the laboratory. FIDEX is delivered with several managerial reports, including:

Examinations by Discipline



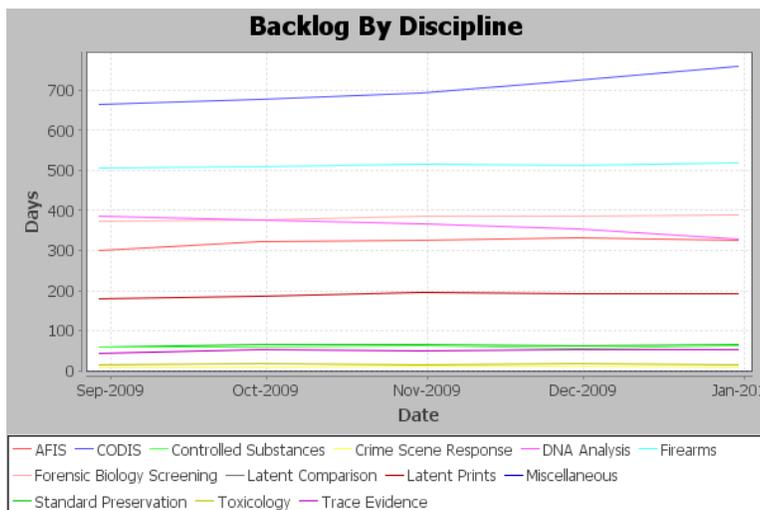
The Examinations by Discipline window provides information regarding the most commonly requested examination types for an agency.

Open Examinations by Discipline



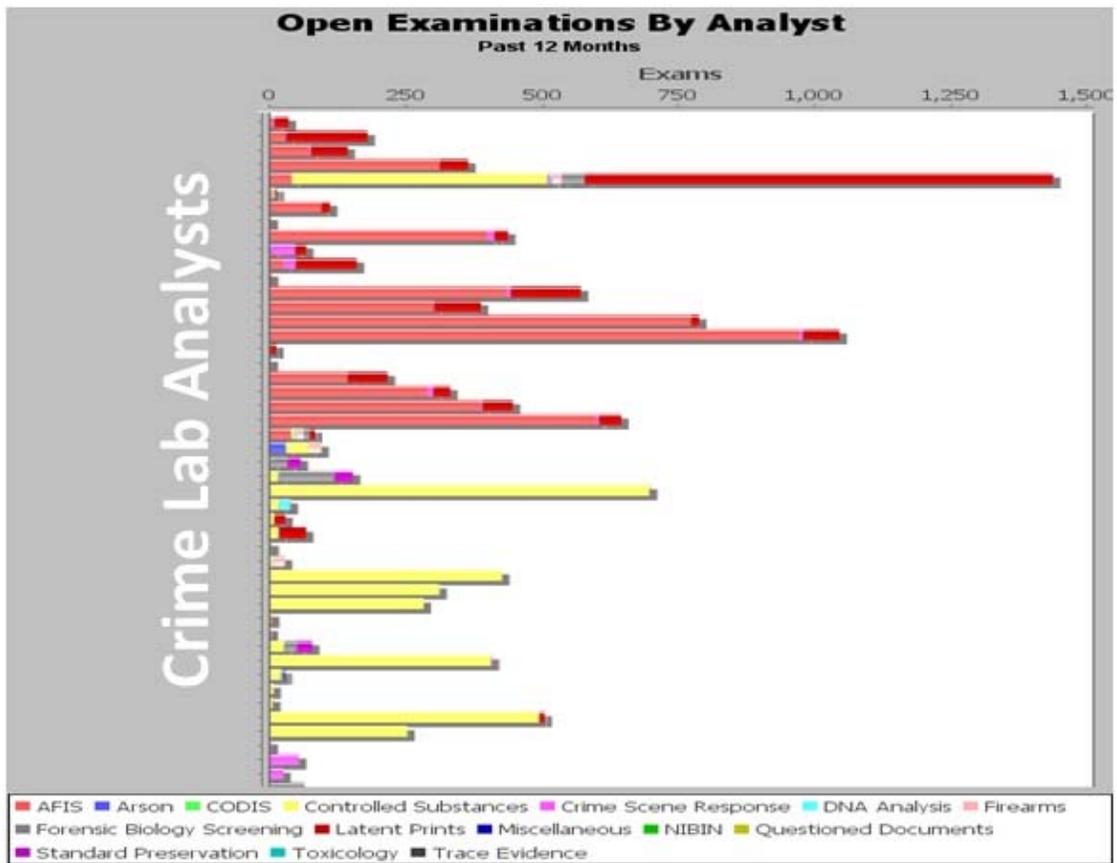
The Open Examinations by Discipline window identifies the percent of open examinations by discipline type.

Backlog By Discipline



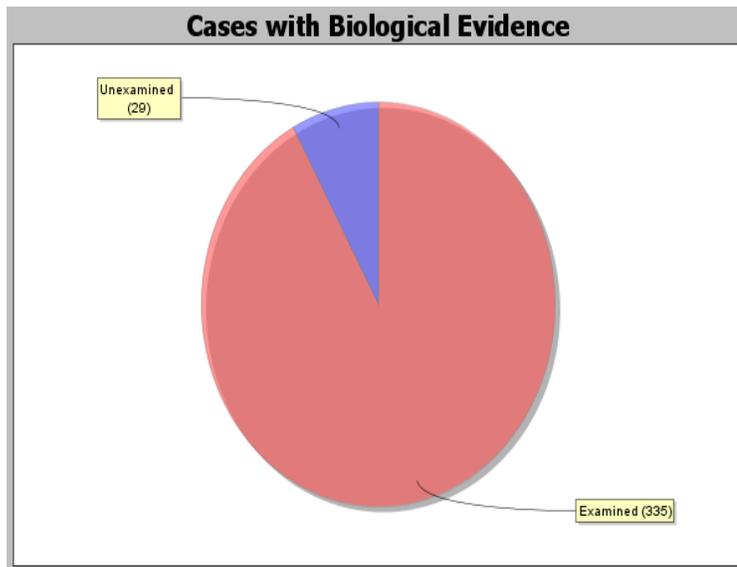
The Backlog by Discipline window provides a longitudinal trend line for how many days an examination takes by discipline.

Open Examinations by Analyst



The Open Examinations By Analyst window provides an opportunity to identify potential bottlenecks by viewing the number of open examinations by analyst.

Cases with Biological Evidence



The Cases with Biological Evidence window identifies cases that have biological evidence that has not been tested. This is a prototype report that one pilot agency is using in an attempt to identify sexual assault kits that have not been submitted for examination.

The FIDEX database has been designed to provide the maximum capability for management reporting. Laboratory directors should consider what information they would like to derive from the FIDEX management reporting feature and consider which reports they would like to develop based on FIDEX data. The system has proven very flexible and user-friendly in its reporting capability.

Cost/Benefit Analysis

Practitioners on the FIDEX team reported that significant amounts of time are being spent by forensic examiners performing routine administrative duties that take away from their ability to perform examinations and analyses. FIDEX has been designed to reduce administrative time spent responding to three specific types of requests:

- **Clarifying and Correcting Examination Requests:** The current paper-based process implemented in most agencies lends itself to errors, including mismatches between

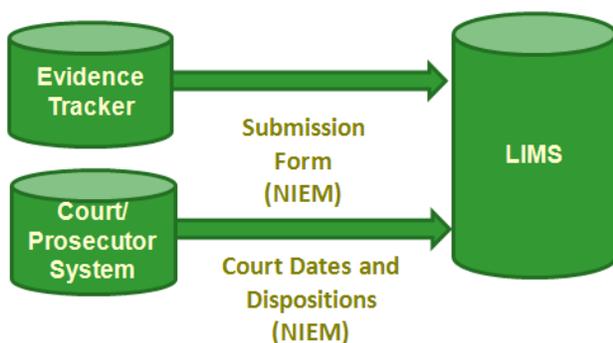
the evidence type and the examination type requested. When requesting an examination through the FIDEX portal, investigators can request only those examinations that are appropriate based on the evidence type.

- **Examination Status Update:** Criminalists report spending extensive time briefing prosecutors and investigators on the current status of a case. The FIDEX portal provides authorized users with a view into the current status of an examination.
- **Caseload Prioritization:** The FIDEX portal provides a mechanism to indicate upcoming court dates. This information is critical to allow coordinators to prioritize their caseload. As these dates approach, users can choose to receive alerts if the case still has open examinations.

Technology Considerations

The FIDEX platform has been designed to work in three implementation configurations: direct data exchange, stand-alone portal and integrated portal. Critical considerations must be evaluated before committing to implementing the FIDEX platform. Below, we discuss many of the issues that have arisen in our pilot sites.

Direct Data Exchange



With direct data exchange, the FIDEX IEPDs can be implemented with a point-to-point (P2P) connection between systems, through an enterprise service bus (ESB) or in conjunction with the portal. The P2P/ESB solutions assume

Figure1: Direct Data Exchange

the agency has the necessary infrastructure and technical expertise to implement XML-based data exchanges. The examination is requested through screens embedded within an RMS/EMS

and then encoded and sent to a Web service running on a laboratory server using the FIDEX specification. This Web service first decodes the received electronic document and stores its contents in a staging database. A staff member from the laboratory then reviews these pending requests and either rejects them or imports them into the laboratory information management system (LIMS). Upon acceptance, the LIMS will assign a crime lab case number and may return that case number to the requesting system.

Benefits

- The above architecture fully leverages existing systems and represents the most straightforward implementation of FIDEX.
- The LIMS and the RMS/EMS must share a common identifier such as the incident number to allow the systems to communicate with each other.

Challenges

- The RMS/EMS must embed the necessary screens to allow an investigator to request an examination.
- The LIMS must be able to import an electronic request using the FIDEX specifications. While LIMS vendors were involved in the development of the specifications, to our knowledge, no vendor has yet implemented them.

Integrated Portal

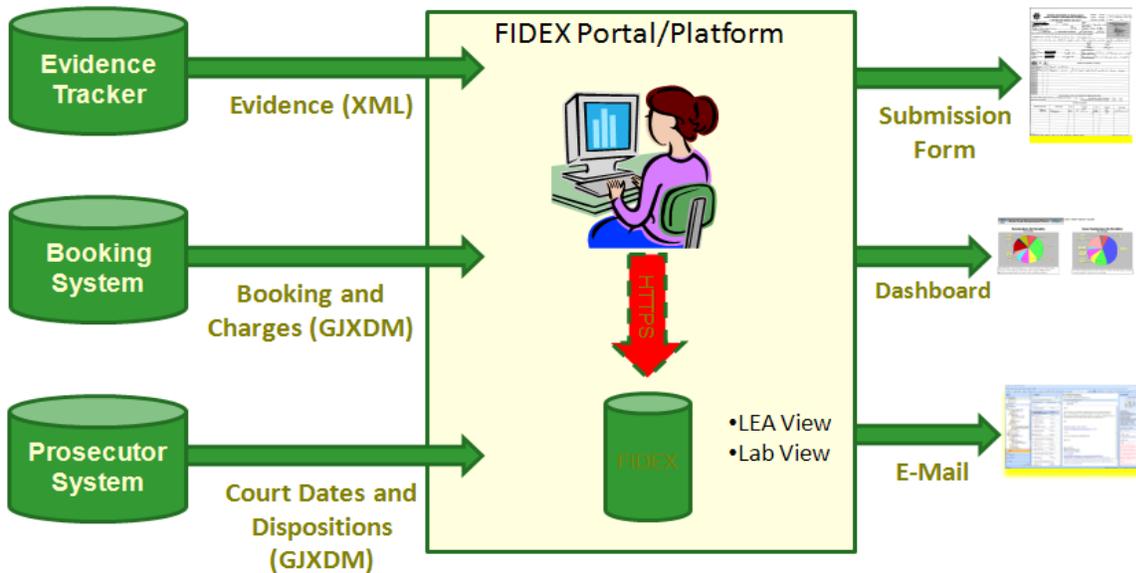


Figure 2: Integrated Portal

Integrating the FIDEX portal into an agency's existing system allows the agency to avoid duplicate data entry while minimizing the need to create custom code on either system. When first submitting an examination request, the user will log into the FIDEX portal and enter the corresponding case number. FIDEX then queries all connected systems and retrieves evidence associated with the incident. From here, users can add examinations to specific pieces of evidence. After the examinations are added, users can submit the examination request to the laboratory with the push of a button. This simultaneously exports the information using the FIDEX examination request IEPD to the LIMS and generates a paper representation to accompany the physical evidence.

Benefits

- Eliminates redundant data entry without requiring modification of the RMS or EMS systems.

Challenges

- Retrieving data from external systems requires access to these systems' databases.

Provided that these databases are Open Database Connectivity (ODBC)-compliant and are not encrypted, this is usually not a problem.

Stand-alone Portal

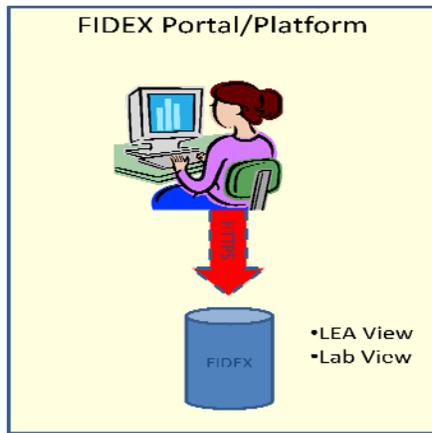


Figure 3: Stand-alone Portal

A stand-alone portal can be implemented “out-of-the-box” in about a day, potentially at no cost to the agency. FIDEX is deployed and runs on an application server such as Apache Tomcat. This option is desirable for jurisdictions wanting to have a solution up and running quickly at little or no cost.

Benefits

- Agencies can have the system up and running with minimum effort and all interested parties can share data.

Challenges

- In this configuration, all information must be manually entered into FIDEX.

Technical Requirements

This section describes the technical requirements for implementing FIDEX.

Software/Web Application Server

The FIDEX portal was written in Java using a combination of Java Server Pages (JSP), Servlets and Java classes for interfacing with the database. The application is distributed using a standard Web Application Resource (WAR) file.

FIDEX requires a Web application server to provide access to the Web-based screens. Although FIDEX pilot sites all used Apache Tomcat 6.x (<http://tomcat.apache.org/download-60.cgi>), any application server can be used. The WAR file is loaded onto the Tomcat server by placing it in the webapps directory. Then Tomcat is restarted, and the WAR file is decompressed and deployed. The default URL for FIDEX is http://127.0.0.1:8080/fidex_portal/.

Database Requirements

FIDEX can be implemented using any database. The database driver, URL, user id and password can be configured through the config.properties file included in the FIDEX package.

Hardware Requirements

FIDEX hardware requirements are minimal. We recommend at least 10GB of available data storage and at least 500 MB of memory.