The author(s) shown below used Federal funds provided by the U.S. Department of Justice and prepared the following final report:

Document Title:	**Offender Tracking Record Transfer Service Specification Development, Final Report**
Author(s):	**Joe Russo**
Document No.:	**249814**
Date Received:	**April 2016**
Award Number:	**2010-IJ-CX-K003**

This report has not been published by the U.S. Department of Justice. To provide better customer service, NCJRS has made this federally funded grant report available electronically.

Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

NLECTC
Corrections Technology Center of Excellence

UNIVERSITY OF DENVER

Offender Tracking Record Transfer Service Specification Development

Final Report – September 30, 2015

Offender tracking systems generate vast amounts of data; however, community corrections agencies that operate offender tracking programs report that it is often difficult to share this data. This problem is most clearly manifested in cases where an agency is ending its contractual relationship with one offender tracking provider and moving to another. Through the Offender Tracking Standard Special Technical Committee, agencies have expressed the desire to automatically transfer as much information as possible (e.g. demographic data, location data, violation and alert data) from a previous provider to populate the data fields of the new provider's system. This capability would allow the retention of important historical data and streamline the client re-enrollment process.

This project was an effort to develop the models and technical components, in the form of a service specification, specific to the transfer of offender tracking information between systems. The goal of this project was to develop a Global Reference Architecture (GRA) Service Specification Package (SSP) for the transfer of offender tracking information (offender tracking record) from one offender tracking system to another.

Further, it is envisioned that this SSP could provide a foundation for future information exchange initiatives between multiple criminal justice agencies and the various offender tracking system providers that operate in this country. The capability for automated information sharing of offender tracking data across jurisdictions and provider software platforms would greatly enhance public safety.

The Corrections Technology Center of Excellence, operated by the University of Denver, contracted with the SEARCH-The National Consortium for Justice Information and Statistics to develop the SSP. SEARCH is nationally recognized as a resource for services and solutions for justice information sharing.

SEARCH's final project technical report follows.

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

Offender Tracking Record Transfer Service Specification

A SEARCH Project Report
September 2015

Background

Offender tracking systems generate vast amounts of data; however, community corrections agencies that operate offender tracking programs report that it is often difficult to share these data. This problem is most clearly manifested in cases where an agency is ending its contractual relationship with one offender tracking provider and moving to another. Agencies have expressed a desire to automatically transfer as much information as possible (e.g., demographic, location, violation, and alert data) from a previous provider to populate the data fields of the new provider's system. This capability would allow the retention of important historical data and streamline the client re-enrollment process.

This document reports on a project SEARCH undertook to develop the models and technical components—in the form of a service specification—specific to transferring offender-tracking information between systems.[1] The goal of this project was to develop a Global Reference Architecture (GRA)[2] Service Specification Package (SSP)[3] for the transfer of offender tracking information (offender tracking record) from one offender tracking system to another.

Further, it is envisioned that this SSP could provide a foundation for future information exchange initiatives between multiple criminal justice agencies and the various offender tracking system providers that operate in this country. The capability for automated information sharing of offender tracking information across jurisdictions and provider software platforms would greatly enhance public safety.

Tracking Information Model Development

A core component of the SSP is the information model. The information model documents the specific data elements, and the structure of those elements, that comprise the information transferred between systems in the form of messages.

In order to develop an offender tracking information model that would be representative of most offender tracking systems, SEARCH assembled 10 subject matter experts (SMEs) for two

[1] SEARCH (www.search.org) undertook this project under a contract with the National Law Enforcement and Corrections Technology Center (NLECTC) and the University of Denver.

[2] http://www.it.ojp.gov/GIST/41/Global-Reference-Architecture--GRA--Framework--Version-1-9-1

[3] http://www.it.ojp.gov/GIST/43/The-Global-Reference-Architecture--GRA--Service-Specification-Guideline-V-1-2-0

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

conference calls in fall 2013. SEARCH provided the SMEs with an initial offender tracking information model in the form of a spreadsheet. SEARCH subsequently modified this spreadsheet based on conference call feedback and offender tracking system information provided by the SMEs. The information model development process was conducted with the intention of providing a final model that would include approximately 90% of the information contained in the majority of offender tracking systems. The remaining 10% of information would typically be considered to be vendor-specific; however, this information could also be mapped as information model extensions (examples of information model extension are included in the SSP).

SEARCH subsequently used the spreadsheet that represented the information model to "map" the business elements in the model (e.g., Agency Name, Tracking Data, Tracking Zone, etc.) to the National Information Exchange Model (NIEM)[4] version 3.1 (figure 1). SEARCH next used the mapping spreadsheet to develop a NIEM Information Exchange Package Documentation (IEPD)—which is a collection of artifacts and XML schema that represent an information model to be used in an information exchange message. The NIEM IEPD in its entirety is included in the SSP. The NIEM data format provides an information sharing standard that can be used to map any vendor data.

	B	C	
1	**Offender Tracking Information Model Mapping**		
2	**Elements**	**Element Description**	**NIEM 3.1 XPath**
3	**DOCUMENT**		
4	Document Creation Date	Date document was created	/exchange:OffenderTrackingInformation/nc:DocumentCreation
5	Document ID	Document ID	/exchange:OffenderTrackingInformation/nc:DocumentIdentific
6	Type of Document	Type or category of the document	/exchange:OffenderTrackingInformation/nc:DocumentIdentific
7	Sequence Number	Document sequence ID	/exchange:OffenderTrackingInformation/nc:DocumentSequenc
8	**TRACKING ASSIGNMENT**		
9	Tracking Start Date	The date a offender is enrolled in a tracking program	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
10	Tracking End Date	The end date for a offender tracking program	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
11	Date/Time Added to System	The date/time a tracking program is added to the tracking system	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
12	**Agency**		
13	Agency Name	Name of the tracking agency	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
14	Agency Phone Number	Telephone number	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
15	Type of Phone	Type of Telephone Number (e.g., home, work, pager, etc.)	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
16	Agency ORI	Agency ORI	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
17		Contact person phone number	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
18	Primary Contact Person	Contact person	/exchange:OffenderTrackingInformation/ext:TrackingAssignme
19	**Tracking Supervision**		

Figure 1: Offender Tracking Information Model Spreadsheet

Tracking System Data Extract Mapping

In an effort to verify the information model, four vendors provided offender tracking system information extracts to "map" to the NIEM offender tracking information model. The vendors provided these extracts in various formats, including XML, comma-delimited, and JavaScript Object Notation (JSON). SEARCH used the mapping spreadsheet to map each vendor extract.

[4] www.niem.gov

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

Data elements that were not in the existing information model were added as vendor extensions to the NIEM model. The result was an updated mapping spreadsheet that mapped four vendor data extracts to the offender-tracking NIEM model.

Using the completed mapping spreadsheet, SEARCH created a NIEM XML representation (XML schema sample instance) for each vendor extract. All XML files are included in the NIEM IEPD as required.

Data Transformation

A high-level view of the flow in a service implementation of the SSP would be as follows (figure 2):

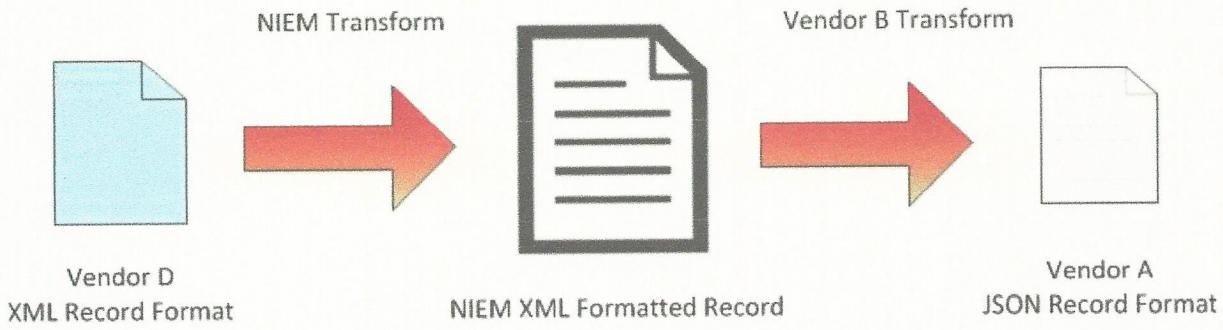

Figure 2: Offender Tracking Record Transformation Flow

By using the NIEM IEPD as the standard format of the offender tracking record, we have an intermediate format to map any vendor extract and avoid the need for a one-to-one mapping of vendor data.

SEARCH included examples of the offender record transformation process in the SSP using Vendor D offender tracking records. SEARCH also used Extensible Stylesheet Language Transformations (XSLT) language to perform the two transformations shown in figure 2. The first transformation transforms the input (Vendor D XML Record) to the NIEM XML format. The second transform transforms from NIEM to the output (Vendor A JSON record format). Both transform xslts and input/output files are included in the NIEM IEPD.

Figures 3, 4, and 5 show the offender tracking record in the Vendor D, NIEM, and Vendor A formats, respectively.

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

```xml
<OffenderTrackingInformation>
  <Person id="ID1 HIDDEN">
    <PersonBirthdate>1967-08-12</PersonBirthdate>
    <PersonName>
      <PersonGivenName>Last Name Hidden</PersonGivenName>
      <PersonSurName>First Name Hidden</PersonSurName>
    </PersonName>
    <PersonOtherIdentification>
      <IdentificationID ns="com.Vendor_D.Production.ASC1.EnrolleeId">1204261</IdentificationID>
      <IdentificationCategoryText>Vendor_D Record ID</IdentificationCategoryText>
    </PersonOtherIdentification>
    <PersonSexText>M</PersonSexText>
  </Person>
  <Offendertracking>
    <TrackingPosition>
      <TrackDate uom="gps">2014-09-19T00:00:59Z</TrackDate>
      <GPSTrackCoordinates crs="wgs84">-87.790905 42.742446 158</GPSTrackCoordinates>
      <Speed uom="mph">0</Speed>
      <BatteryOnChargerIndicator>false</BatteryOnChargerIndicator>
    </TrackingPosition>
  </Offendertracking>
</OffenderTrackingInformation>
```


Figure 3: Vendor D Record – Vendor XML Format

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

```
1  <exchange:OffenderTrackingRecord>
2    <ext:TrackingAssignment>
3      <ext:TrackingSupervision>
4        <nc:ActivityIdentification>
5          <nc:IdentificationID>1204261</nc:IdentificationID>
6          <nc:IdentificationCategoryText>Enrollee ID</nc:IdentificationCategoryText>
7        </nc:ActivityIdentification>
8      </ext:TrackingSupervision>
9    </ext:TrackingAssignment>
10   <ext:Subject>
11     <nc:RoleOfPerson structures:ref="idPerson189264312"/>
12   </ext:Subject>
13   <ext:OffenderTracking>
14     <ext:TrackingPosition>
15       <ext:TrackDateTimeLocal>
16         <nc:DateTime>2014-09-19T00:00:59Z</nc:DateTime>
17       </ext:TrackDateTimeLocal>
18       <ext:TrackingPoint>
19         <geo:LocationGeospatialPoint>
20           <gml:Point gml:id="idGPSTrackCoordinates189267056">
21             <gml:pos>-87.790905 42.742446 158</gml:pos>
22           </gml:Point>
23         </geo:LocationGeospatialPoint>
24         <ext:TrackingCategoryText>gps</ext:TrackingCategoryText>
25       </ext:TrackingPoint>
26       <nc:SpeedMeasure>
27         <nc:MeasureValueText>0</nc:MeasureValueText>
28       </nc:SpeedMeasure>
29       <ext:BatteryOnChargerIndicator>false</ext:BatteryOnChargerIndicator>
30     </ext:TrackingPosition>
31   </ext:OffenderTracking>
32   <nc:Person structures:id="idPerson189264312">
33     <nc:PersonBirthDate>
34       <nc:Date>1967-08-12</nc:Date>
35     </nc:PersonBirthDate>
36     <nc:PersonName>
37       <nc:PersonGivenName>Last Name Hidden</nc:PersonGivenName>
38       <nc:PersonSurName>First Name Hidden</nc:PersonSurName>
39     </nc:PersonName>
40     <nc:PersonSexText>M</nc:PersonSexText>
41   </nc:Person>
42 </exchange:OffenderTrackingRecord>
```

Figure 4: Vendor D Record – NIEM XML Format

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

```
1   [
2     {
3       'id' : "1204261"
4
5       'surname' : "First Name Hidden"
6       'first_name' : "Last Name Hidden"
7       'dob' :  "1967-08-12"
8       'gender' : "M"
9     }
10    {
11      'event_time' : "2014-09-19T00:00:59Z"
12      'lat' : "42.742446"
13      'lon' : "-87.790905"
14      'position_type' : "gps"
15      'speed' : "0"
16      'charge' : "No"
17    }
18  ]
```


Figure 5: Vendor D Record – Vendor A JSON Format

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

Service Specification Implementation Example

Figure 6 illustrates an implementation of the SSP in accordance with the GRA. In this example, an intermediary implementation of the Offender Tracking Record Transfer Service receives a NIEM-formatted record transformed by the service consumer client (e.g., Vendor D). The intermediary "routes" the NIEM record to Vendor A, hosting an Offender Tracking Record Recording Service. This service receives the NIEM record from the intermediary and transforms the record to the Vendor A JSON format for importation into the Vendor A Offender Tracking System.

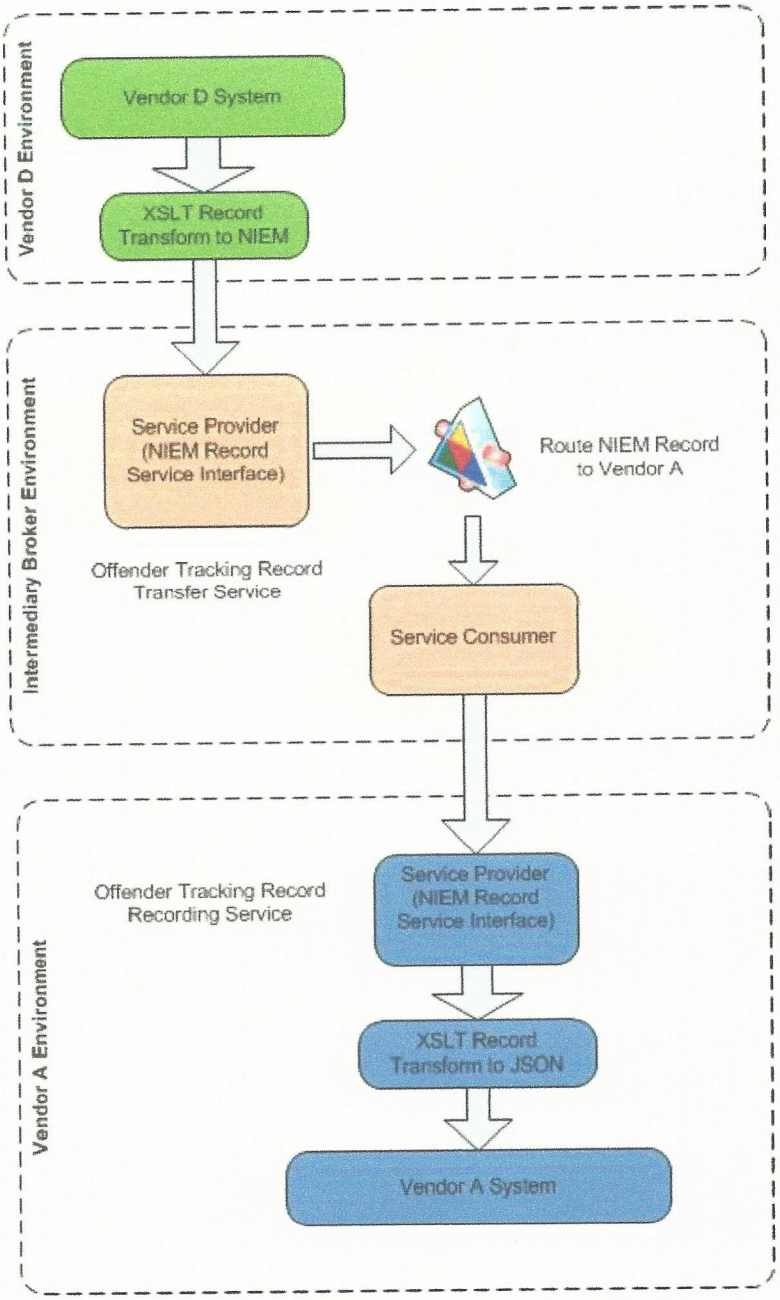

Figure 6: Service Implementation Flow Diagram

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

Summary

As a result of this project, SEARCH developed a GRA Service Specification Package (SSP) that would allow an agency responsible for offender tracking to migrate offender tracking information from one system to another. The Offender Tracking Record Transfer Service Specification contains all artifacts, including a NIEM IEPD, sample vendor offender tracking system records, and a record transformation example to facilitate implementation of the service in a real-world environment.

The Offender Tracking Record Transfer SSP was submitted to Global[5] for adoption as a reference service specification on September 14, 2015. The Global Standards Council will review and provide feedback for any modifications, along with its recommendation regarding adoption of the SSP.

Reference service specifications are considered service specifications that meet the majority of service requirements for a typical exchange, but may require additional modification to satisfy specific policies and requirements within a real-world service implementation. Reference Service Specifications are intended to be used by practitioners nationwide to accelerate their own service specification development process. As such, the goal of each reference specification is to address most, but not all, requirements—and the "80/20" rule is followed, wherein 80 percent of what all agencies require will be provided, with the understanding that the remaining 20 percent would be customized locally. A current list of reference SSP adopted by Global is available on the Global Information Sharing Toolkit website.[6]

As outlined in this report, the SSP can be used as a template for implementing a real-world service to transform offender tracking records between systems. Agencies should be encouraged to reference the SSP in future RFPs for the acquisition of an offender tracking system in order to preserve current offender tracking records.

[5] The Global Justice Information Sharing Initiative (Global) serves as a Federal Advisory Committee (FAC) and advises the U.S. Attorney General on justice information sharing and integration initiatives.

[6] https://it.ojp.gov/GIST/Guide/43/Show-me-all-Reference-Service-Specification-Standards-developed-thus-far-

This document is a research report submitted to the U.S. Department of Justice. This report has not been published by the Department. Opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.