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US-VISIT Identity Matching Algorithm Evaluation Program:

ADIS Algorithm Evaluation Project Plan Update

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Technical Report

submitted to the

U.S. Department of Homeland Security

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Introduction

This document is an update to the “ADIS Algorithm Evaluation Project Plan¹” specified in the Statement of Work for the US-VISIT Identity Matching Algorithm Evaluation Program, as deliverable II.D.1. The original plan was delivered in August 2010. This document modifies the plan to reflect modified deliverables reflecting delays in obtaining a database refresh. This document describes the revised schedule of the program deliverables. The detailed description of the processes used, the statistical analysis processes and the results of the statistical analysis will be described fully in the program deliverables.

The US-VISIT Identity Matching Algorithm Evaluation Program is work performed by Lawrence Livermore National Laboratory (LLNL) under IAA HSHQVT-07-X-00002 P00004 from the Department of Homeland Security (DHS).

1 Scope

This plan describes completed and anticipated work to be performed under the current contract for the US-VISIT Independent Verification and Validation Project. This contract is a follow-on effort to FY09 work performed by LLNL for DHS, which will be referred to as “the previous project.”

The previous project:

- Characterized the quality of the contents of the ADIS Database
- Evaluated the performance of the identity matching algorithm used in the IBIS-loader
- Proposed and evaluated a modification of the matching algorithm
- Developed a survey of COTS/GOTS identity matching products

The goals of the current contract are to extend the previous work to:

- Evaluate the reliability of the Fingerprint Identification Number (FIN) in the ADIS context
- Establish improved performance metrics utilizing FIN reliability information
- Evaluate the current performance of the ADIS matching algorithms

2 Original Schedule

In the Statement of Work in the original IAA a schedule was laid out for a one year project where:

¹ US-VISIT Identity Matching Algorithm Evaluation Program: ADIS Algorithm Evaluation Project Plan, C. W. Grant, J. S. Lenderman, J. D. Gansemer, July 2010, LLNL-TR-450071

- The ADIS database snapshot would be delivered and installed 30 days after the start of the contract.
- 330 days of work leading to project deliverables (that are dependent on the ADIS database snapshot) were scheduled after the installation.

Procedural delays caused the ADIS database snapshot shipping date to be pushed back to about 180 days after the contract start, with the installation of the database at LLNL finished at about 190 days after the contract start. The remaining 170 remaining days were not sufficient for the originally planned deliverables and re-scoping the project deliverables was required.

A revised SOW with a modified schedule of deliverables was proposed by US-VISIT in January 2011 which contained a few minor problems with regard to the order of deliverables. Addressing those problems (changing the order of some of the deliverables to reflect inter-dependencies) resulted in the current schedule below. US-VISIT and LLNL at this point have informally agreed to this revised schedule.

3 Current Schedule

The informally agreed upon final deliverable schedule is presented in Table 1.

Report (or Delivery)	Due date	Status
Evaluation Environment Configuration	Feb 1, 2010	Delivered
ADIS Algorithm Evaluation Project Plan	July 20, 2010	Delivered
ADIS database snapshot delivered and installed	Apr 20, 2010	Nov 2010
FIN Reliability Analysis	Feb 15, 2011	Delivered
ADIS Algorithm Evaluation Project Plan Update	Feb 28, 2011	This Document
Performance Metrics Configuration (was Baseline Dataset and Performance Metrics Configuration)	Mar 1, 2011	In Progress
Matching Performance Analysis (was Name/Identifier Re-Weighting Analysis)	Mar 30, 2011	In Progress
Final	Apr 19, 2011	In Progress
Enhanced/New Technologies Record Matching		Cancelled
Data Visualization Tools & Techniques		Canceled
COTS/GOTS Record Matching Performance Evaluation		Canceled
Baseline Dataset (was Baseline Dataset and Performance Metrics Configuration)		Canceled

Table 1, Current Deliverable Schedule

4 Scheduling Constraints

There are a number of dependences between US-VISIT provided data and the originally scheduled LLNL deliverables as well as between the different LLNL deliverables. Some of these dependences are listed below.

- The Final Report is dependent on the Matching Performance Analysis Report.
- The Enhanced/New Technologies Record Matching Report was dependent on the Matching Performance Analysis Report (the Enhanced/New Technologies Matching Report may proceed if further work is authorized after the current contract end).
- The Matching Performance Analysis Report is dependent on the Performance Metrics Configuration Report.
- The Performance Metrics Configuration Report is dependent on the FIN Reliability Analysis Report.
- The FIN Reliability Analysis Report is dependent on LLNL receiving and installing the current ADIS database snapshot.
- Although the contract started on April 20, 2010, the ADIS database snapshot was not delivered to LLNL until late October 2010 after which it was installed and ready for use by November 1, 2010, six and one half months after the contract start.
- The Algorithm Evaluation Project Plan Report stressed the need to redefine the deliverable schedule after ADIS database snapshot was installed and ready. This redefinition occurred in January 2011 (although it required minor correction), nine months after the contract start.

The dependencies between the currently scheduled deliverables are shown in Figure 1. This analysis gives rise to the deliverable schedule laid out in Table 1. Completed activities are shown in filled boxes.

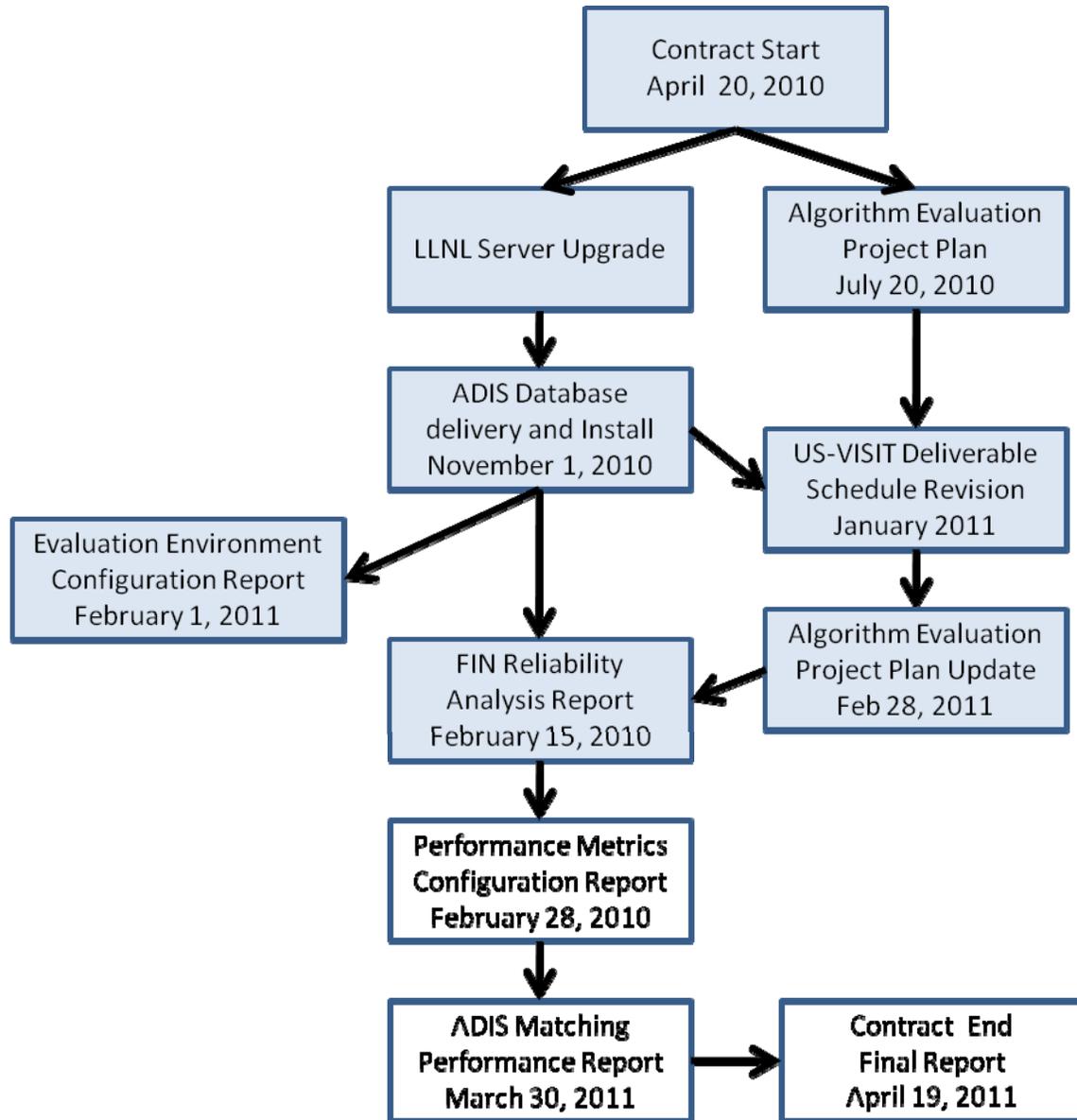


Figure 1, Current Deliverable Dependencies

A brief description of the remaining deliverables can be found the next section.

5 Task Summary

A number of tasks (some of which do not correspond directly with a deliverable) specified in the original Project Plan are complete, while others have been eliminated. A detailed description of these tasks (which is unchanged) can be found in the original Project Plan. Three tasks (and three deliverables) remain to be completed under the current contract. The status of each task is shown below.

Completed tasks:

- Database shipment preparation
- Database server performance and capacity upgrades
- Pre-database delivery FIN reliability analysis
- Table ordering optimizations
- Algorithm Evaluation Project Plan
- Algorithm Evaluation Project Plan Update (this deliverable)
- Environmental configuration report
- Post-database delivery FIN reliability analysis
- FIN Reliability Analysis Report

Tasks eliminated:

- Data Visualization Tools and Techniques Report
- COTS/GOTS Record Matching Performance Evaluation Report
- Baseline Dataset Evaluation
- New/Enhanced Techniques Record Matching Report (this report may be rescheduled after the current contract period)
- Re-Weighting Analysis Report

Tasks remaining:

- Performance Metrics Configuration Report
This report describes the statistical metrics we will use to evaluate matching performance and how we take expected FIN errors into consideration. This performance metric will be improved for the previous contract's performance metric by utilizing the FIN reliability analysis.
- ADIS Matching Performance Report
This report presents our performance (accuracy) estimate of the identity matching process used in the ADIS database system. It will describe the process and results of applying the above improved performance metric to the ADIS database system as recorded in the August 2010 ADIS database snapshot.
- Final Report
This report will summarize all of the deliverables of this contract and describe any changes or updates implemented to processes or results reported in the other deliverables.