

NISTPack by Aware

SOFTWARE TOOLKIT FOR BUILDING COMPLIANCE WITH ANSI/NIST "DATA FORMAT FOR THE INTERCHANGE OF FINGERPRINT FACIAL AND SCAR/MARK/TATTOO INFORMATION"

KEY FEATURES

- Includes a C language or Java class library that allows software developers to easily develop applications to read, write, edit and view ANSI/NIST compliant biometric data
- Includes ActiveX Control for Visual Basic programming
- Complete with run-time applications and demos with source code
- Supports record types 1-15 of the standard (including fingers, palms, faces, latents, and minutiae)
- Includes Aware optimized WSQ and JPEG2000

NISTPack is a complete suite of software development tools that enable software developers to build systems to generate, view, edit and validate ANSI/NIST and FBI EFTS compliant fingerprint, palm print, mug shot, and demographic data interchange files.

NISTPack enables government agencies, systems integrators, and vendors of fingerprint and facial imaging systems to comply with the ANSI/NIST standard: "Data Format For The Interchange Of Fingerprint, Facial, and Scar/Mark/Tattoo Information," and the FBI's implementation of it: "Electronic Fingerprint Transmission Specification."

NISTPack supports both the generic ANSI/NIST standard and agency specific implementations of the standard. Through a text-based rule file called the NISTPack Validation File, the agency specific implementations of the FBI, RCMP, UK, Bundeskriminalamt (BKA), Interpol, and all 50 US states are supported.

The ANSI/NIST Fingerprint Interchange standard is widely used and supports several different types of biometric and demographic data. NISTPack provides API support to insert and remove any full record, field, subfield, or item from an interchange file. NISTPack supports all record types defined by the standard.

EXAMPLE OF A THE CUSTOMIZABLE USER INTERFACE THAT CAN BE BUILT WITH NISTPACK. THIS IS A CARD SCAN APPLICATION THAT SHOWS THE SCANNED FINGERPRINTS AND THE REQUIRED DEMOGRAPHIC DATA FIELDS FOR AN FBI CIVIL APPLICANT BACKGROUND CHECK.

The screenshot shows a software application window titled "Aware (nt) - Civil App. Submission Demo". The window has a menu bar with "File", "Load Transaction", "Scan", "Image Quality", "Demographic Information", "View Transaction", and "Submit Application". The main area is divided into two sections: "Demographic Data" and "Transaction Info".

Demographic Data:

Applicant's Name (Last, First): Smith, Fred	Date Fingerprinted: 6/10/1999
Place of Birth: Unknown	Date of Birth: 11/29/1962
Race: Caucasian/Latino	Hair Color: Black
Sex: Female	Eye Color: Black
Height: 5 Feet 00 Inches	Weight: 130 Lbs.

Transaction Info:

Submission Date: 4/30/2003	Type of Transaction: NFFC
Trans. Control Number: ABAMENAD3043011300949	Reason for Finger Printing: Applicant
Dist Agency Id: WAMAF102	Retention Code: No
Org Agency ID: DC9104912	Priority: Highest
Contributor Agency Identifier: MENA12345	

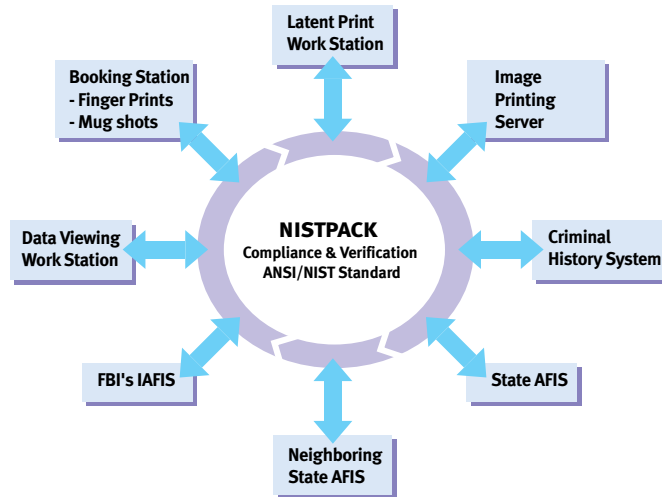
Below the form is a window titled "10 Print Card" showing a grid of 10 scanned fingerprints. The grid is arranged in three rows: the first two rows have five prints each, and the third row has five prints. The prints are grayscale images of fingerprints.

This includes the most commonly used record types shown here:

- ▼ **Type 1 Record, Transaction Information**
- ▼ **Type 2 Record, User Defined Descriptive Text Record**
- ▼ **Type 4 Record, High Resolution Gray Scale Fingerprint Image Record**
- ▼ **Type 7 Record, User Defined Image Record**
- ▼ **Type 8 Record, Signature Image Record**
- ▼ **Type 9 Record, Minutiae Data Record**
- ▼ **Type 10 Record, Facial & SMT Record**
- ▼ **Type 13 Record, Variable Resolution Latent Image Record**
- ▼ **Type 14 Record, Variable Resolution Tenprint Image Record**
- ▼ **Type 15 Record, Variable Resolution Palmprint Image Record**

NISTPack provides an easy-to-use library of functions and a set of software tools that simplify the process of managing this data. It ensures that digitized images are properly compressed, that demographic data is included in the correct format, and that the resulting file is constructed properly for interoperability with other agencies or other standard-compliant vendors.

NISTPACK PROVIDES THE SOFTWARE LINK BETWEEN VARIOUS BIOMETRIC INFORMATION SYSTEMS SUCH AS LIVE SCAN, ELECTRONIC MUG SHOT, CRIMINAL HISTORY, STORE AND FORWARD SYSTEMS AND AFIS SYSTEMS.



FEATURES OF NISTPACK BY AWARE

C Library

NISTPack includes a C language library that allows software developers to easily develop applications to read, write, edit and view ANSI/NIST compliant biometric data. The C library supports several versions of Unix and all variants of Microsoft Windows. NISTPack's C language API provides the ability to insert or remove individual data items or images into or from an existing ANSI/NIST transaction file or to build an entire transaction file by populating it with the required data and images.

ActiveX Controls

NISTPack includes ActiveX controls for programmers who prefer to program in the Visual Basic programming environment. By dragging and dropping Aware's ActiveX controls onto a Visual Basic form, programmers can quickly design an ANSI/NIST compliant biometric application.

The ActiveX API includes all of the same functionality as the C library. This includes image compression/decompression, image file conversion,

the optional ability to read and write data by tag names instead of by field numbers, and high quality fingerprint image printing, (when used with AccuPrint by Aware).

Java JNI Interface

A full Java Native Interface API is available for those developers that prefer to program in Java. The Java API includes all of the functionality of the C API. Documentation is provided in the Javadocs form.

Data Validation

NISTPack incorporates a flexible and easy-to-use validation capability. Validation is important because the ANSI/NIST data interchange format is largely a description of the file format. The demographic data record, the type 2 record, is "user defined." Every agency populates this demographic data record differently, but at the same time all agencies have strict requirements and rules regarding the format and type of data that they will accept.

Additionally, different agencies support different transaction types and each of these require a different set of image records.

The NISTPack validation engine uses a text file that holds the rules defined by each agency's implementation of the ANSI/NIST standard. It validates transactions based on the following common requirements:

- ▼ **Mandatory and optional fields for each type of transaction**
- ▼ **Mandatory and optional records for each type of transaction**
- ▼ **Minimum and maximum field lengths**
- ▼ **Data type: alpha, numeric, or special characters**
- ▼ **Interfield dependencies**

The API provides functions that compare the contents of a NIST transaction file with the rules defined in the Aware error verification file. If errors are detected, NISTPack generates detailed error messaging that points directly to the non-compliant data. The error message includes the field, subfield, and item number of where the error was detected and provides a detailed description of the nature of the error.



EXAMPLE LIVESCAN USER INTERFACE THAT SHOWS THE ELECTRONICALLY ACQUIRED FINGERPRINT IMAGES AND BUTTONS TO APPLY THE AWARE IMAGE QUALITY AND SEQUENCE CHECK FUNCTIONS.

NISTPack includes pre-configured error verification files for the **FBI, RCMP, Interpol, UK, Bundeskriminalamt (BKA), Western Identification Network (WIN), and all 50 states.**

Custom Validation Support

The NISTPack validation engine also supports custom validation capabilities that allows a developer to extend the built-in logic of NISTPack. This is provided by the usage of "custom tags." The custom tags reference external logic that is invoked when encountered by a specific field validation function.

Support For Code Tables

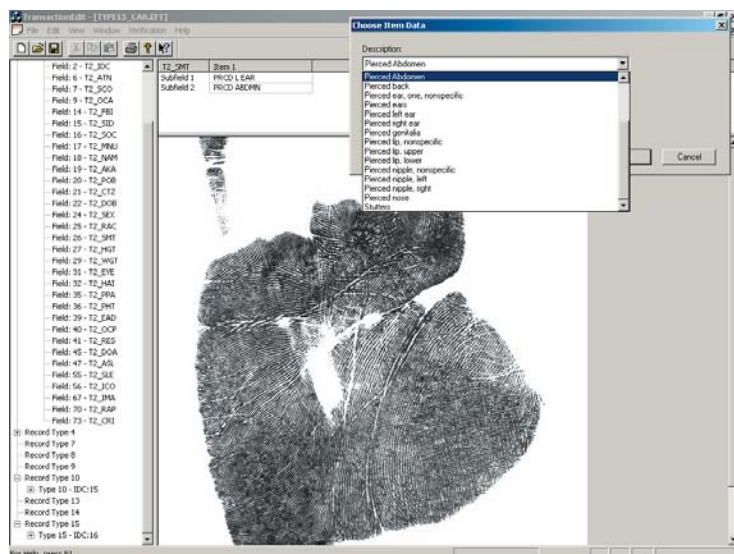
Certain fields must be populated with NCIC codes or data from large tables. The NISTPack Validation File supports the usage of these external tables for both validation purposes and for integration as menus of acceptable data options for those fields that require it.

NIST To XML Format Conversion

The NISTPack API and utilities include functions to convert NIST formatted demographic and image data to XML formatted data. The XML format is simple and closely mirrors the NIST file format. Images can be exported as stand-alone files or they can be base64 encoded and embedded into the XML file.

Easy Data Viewing

NISTPack's ease-of-use and uniquely functional tools have made it the de-facto standard for managing ANSI/NIST compliant biometric data. The SDK ships with several utilities that can be used as stand-alone applications. Examples of these are shown in the figures.



THE POPULAR NISTPACK TRANSACTIONEDIT UTILITY SHOWING A TYPE 15 RECORD (PALM IMAGE) AND A DROP DOWN MENU OF NCIC CODES FOR THE SCAR/MARK/TATTOO FIELD. ALL IMAGE AND TEXT DATA WITHIN THIS INTERCHANGE FILE CAN BE VIEWED, ADDED, OR REMOVED THROUGH THE EXPANDABLE MENU SHOWN ON THE LEFT OF THE SCREEN. SOURCE CODE FOR TRANSACTIONEDIT IS INCLUDED WITH THE SDK.

The data and images can be viewed at multiple Microsoft Windows or Unix work stations within a single agency or department through a standard Windows or Unix user interface or, alternatively, through an agency's Intranet via a common web browser.

FBI-Certified WSQ

NistPack includes Aware's highly optimized and FBI certified WSQ compression/decompression library. Aware is the primary domestic and international provider of WSQ fingerprint compression/decompression software.

The proven reliability and speed of WSQ by Aware has made it the WSQ implementation of choice in livescan and AFIS installations around the world. Used in some form by every state and federal agency, WSQ by Aware is the most efficient, risk free, and field proven implementation of WSQ available.

Standard-Compliant Image Compression

In addition to WSQ, NISTPack is bundled with several standard compliant image compression engines to facilitate standard compliant data creation and viewing. These include:

- ▼ **JPEG for type 10 records (facial and scar/mark/tattoo images)**
- ▼ **Lossless JPEG2000 for type 13 records (latent fingerprint images)**
- ▼ **G4 fax for type 7 and 8 records (scanned documents and signatures)**
- ▼ **JPEG200 encoding/decoding for type 14 records ("variable resolution" ten-print records)**

BENEFITS OF NISTPACK BY AWARE

Compliance: Compliant with the accepted ANSI/NIST standard.

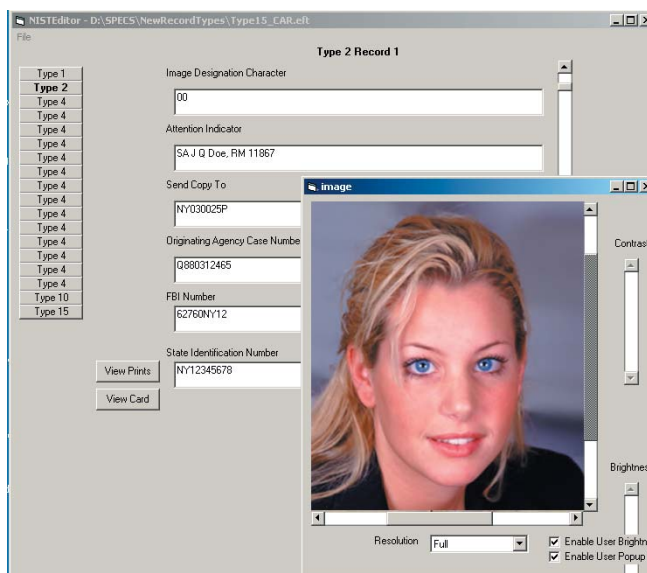
Interoperability: NISTPack enables the exchange of biometric image and text data with all other ANSI/NIST standard compliant systems.

File I/O: NISTPack provides an easy way to import and export images between a NIST file and other systems or file types. Import/export file conversion includes two way support for BMP, TIF, JPEG, and JPEG2000.

Cost-Effective: Use of NISTPack greatly reduces the cost and time required to develop ANSI/NIST compliant systems from scratch.

Easy Upgrade: NISTPack is maintained by Aware's dedicated engineering team to support changes in the ANSI/NIST standard as they are adopted and to support agency requirement for new data fields and new records.

THE NISTEDITOR PROGRAM SHOWING A TYPE 10 RECORD (FACIAL IMAGE) AND THE FIRST FIVE TYPE 2 FIELDS (DEMOGRAPHIC DATA). NISTEDITOR PRESENTS A SLIGHTLY DIFFERENT USER INTERFACE EXAMPLE. SOURCE CODE FOR IT IS INCLUDED WITH THE SDK.



NISTPACK SPECIFICATIONS

SUPPORTED PLATFORMS

- MS Windows Desktop and Server-All variants
- Windows CE/PocketPC
- Sun Solaris
- AIX
- UnixWare
- Linux
- HP-UX
- Others as requested

SUPPORTED PROGRAMMING LANGUAGES

- C/C++
- Java
- Visual Basic

ABOUT AWARE

Aware, Inc., a pioneer and recognized leader in wavelet technology, provides compression solutions targeted to tele-radiology, video surveillance, remote sensing, seismic data, FBI-compliant fingerprint images, and still image multimedia. Please contact Aware for more information.



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