

IWS™ EPI™ Builder Technical White Paper

What is IWS EPI Builder?

IWS EPI Builder is an easy-to-use, yet powerful software developer's kit (SDK) to build virtually any type of secure ID document application or incorporate identification capabilities into existing applications.

The SDK includes a collection of software building blocks (or components) that can be assembled into a Web or client server-based application using standard, off-the-shelf development environments such as Microsoft Visual Studio, Delphi and Microsoft Visual Studio.Net. The components are standard ActiveX and COM-based controls that can be tightly integrated with another application's graphical user interface (GUI) and business logic to provide a look and feel similar to an existing application. Unlike other toolkits on the market today, which are a collection of software libraries and function calls, IWS EPI Builder's open, modular, reusable architecture prevents developers from having to rebuild an entire application if third party peripheral or software requirements change. The end result is a project that is delivered on time, within budget and is easy to keep current.

IWS EPI Builder's components can be used to design badges, manage ID information, capture images, capture and search biometrics and print/encode cards. IWS EPI Builder also utilizes open standards to exchange data with other systems and add virtually any type of biometric identification tool. New or different biometrics can be plugged in to IWS EPI Builder without having to change the application code – simply code the application once and it can support the latest biometric devices and matching/searching technology. Other open interfaces are available to plug in custom image capture devices, card printers, encoders and bar codes without having to change the application code.

What components are included with IWS EPI Builder?

The IWS EPI Builder Framework

Diagram 1A shows the IWS EPI Builder framework and how the different components interact to provide a solution. Basically, IWS EPI Builder components can be classified as either imaging components which capture, store, view, manage images; biometric components which create minutia, conduct searches and store data; and print and design components which print and encode cards and create card layout designs.

Imaging Component

The ImageCTRL ActiveX control manages all imaging operations including image acquisition, display, capture, resizing, cropping, enhancement and deletion. This customizable component offers a wide range of functions that give the application designer total control over user interfaces, dialogs, raw image data and image storage. User definable properties permit extensive flexibility over image definitions such as aspect ratio, compression, format and color depth.

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Image Capture Component

The Capture ActiveX control captures images and biometric data from external devices such as cameras, page scanners or fingerprint scanners. The Capture Component uses a plug-in architecture to support a wide variety of capture devices. Image enhancement and cropping are an automatic part of the capture process. The ActiveX control allows an application designer to display live video on screen and control camera parameters such as pan, tilt, zoom, resolution, focus, flash and other camera features. The Capture Component is also used by the ImageCTRL and BioBIR components to capture biometric data from readers such as fingerprint scanners, iris scanners and microphones. It can also perform automatic image contrast adjustment.

GALImage

GALImage is a low level COM component enables images to be rendered on a card or screen. It is called by the ImageCtrl to display an image on the screen or Layout to print it on a card. It also manages loading and saving of files in many different formats and provides image manipulation features such as flip, color correction, histogram, brightness and contrast.

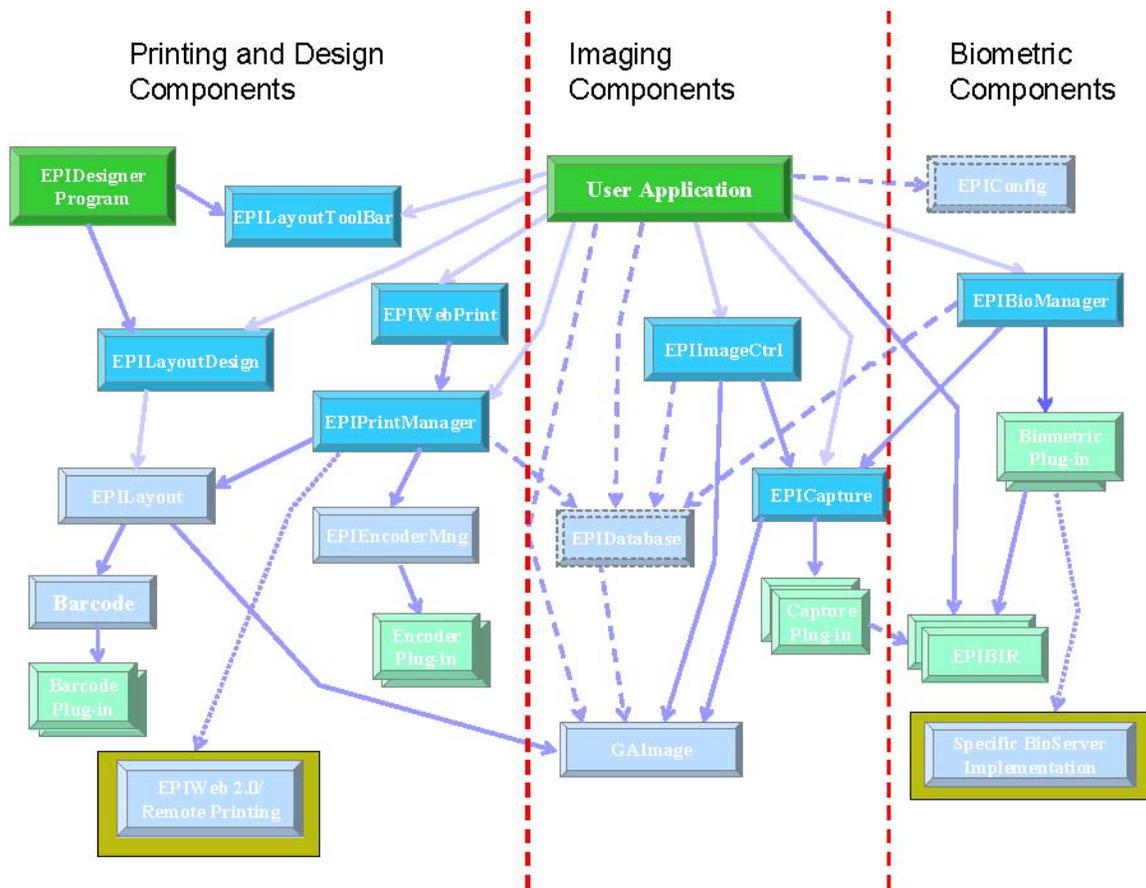


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Image Capture Plug-In

This is a specific component developed by ImageWare to acquire images from a specific vendor's imaging device.

Camera Driver

ImageWare's camera driver is designed specifically for the needs of the ID marketplace. Combined with a camera, it enables anyone to take great looking pictures quickly and easily, with minimal training. IWS EPI Builder camera drivers are available for a variety of cameras with different price points. This allows integrators and OEMs to create and sell easy-to-use ID software/camera bundles at a variety of price points. IWS EPI Builder can integrate with a variety of cameras, including but not limited to:

The Canon A70, A75, A80, A85, A95, A510, A520, G3, G5, G6

These cameras are ultra-compact, AA-battery powered models that provide numerous high-end features including an aluminum alloy exterior, 3x optical zoom lens, 5-point AiAF auto focus system, live video display, close focus to 2-inches and a full range of exposure modes including program, shutter priority, aperture priority and manual.

Face Finder Plug-in

Taking a good photo is a difficult task. Without an experienced photographer, photos can be off center and over or under exposed. ImageWare's Face Finder Plug-in automatically locates a face within an image, centers and crops it, ensuring a perfect photo every time. During extensive testing, the algorithm has proven to be over 99% effective in accurately locating the exact position of human faces - regardless of a person's skin color or eye structure.

The system can be configured to operate in two ways, with a user interface and without. During the enrollment phase, the user interface method causes a dialog to display the original, newly captured image and the proposed cropped image. At this point the user may choose to accept the chosen crop rectangle, override that choice by manually selecting another rectangle with the mouse, or cancel the action altogether to capture another image. In the non-user interface method, the image is automatically cropped and saved after image capture with no user interaction, thus saving valuable time during the enrollment phase.

In either of these two operation modes, the system can be configured to not accept images beyond certain minimal dimensions, ensuring that only quality images make it through the capture phase. In rare circumstances the operator is alerted to recapture the image. In such an instance, the operator would typically advise the enrollee to step closer the camera or adjust the camera settings.

The exact desired cropping size with respect to the face can also be preconfigured in the system to offer various final cropped image formats. For example, in some applications it is desirable to follow NIST (National Institute of Standards and Technology) standards for mug shot databases whereby each face takes up 50% of the width of the mug shot image. If it becomes essential to have closer cropping of the faces for other applications, this can easily be configured.

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Printing/Encoding and Design Components

The PrintManager ActiveX control manages all printing operations among the IWS EPI Builder components (such as preview, print and encode) for both single card and batch printing. It reads card/document templates created using the Designer Application. Badges are printed using information and images provided by the application (no database mode) or read from specified data (full database mode) sources. The PrintManager ActiveX control also encodes magnetic stripes and smart chips and reads pre-encoded proximity cards.

ImageWare can assist developers in building e-purse, multi-application or hybrid card encoding applications by developing custom encoder dlls that work with your chip and encoder controller board.

The Designer Application

The Designer Application allows you to design any number of professional looking, high quality, secure card/document layouts in minutes. Import eye-catching graphics to be used as backgrounds and personalize designs with the company logos. Create shapes, static and dynamic text, digital photos, signatures and fingerprints, and bar codes (both linear and 2D). Encode smart chips, or all three tracks on magnetic stripes using the application and database information of your choice. The Designer Application is also included as an executable file and can be used to design AAMVA-compliant driver license and ICAO-compliant travel documents.

Layout Design Component

The Layout Design Component and Layout Toolbar ActiveX controls allow application designers to integrate badge design features into their own applications. The entire user interface of the Designer Application can be reproduced with these two ActiveX controls. The Layout Design ActiveX can also be used to display previews of badges with images and data. These controls allow you seamlessly imbed card designs into an application and protect access to it using a security model.

Web Print Component

The Web Print ActiveX control provides a simplified way to call the printing functions of the Print Manager control from an HTML Web page so that cards can be viewed and printed locally in a Web browser. The Web Print ActiveX does not provide all of the functionality that is available by calling the Print Manager directly.

Encoder Plug-ins

ImageWare can use the IWS EPI Builder encoder wizard to build custom encoder plug-ins to encode contact, contactless and magnetic stripe cards. Some of the Smart Card plug-ins built using EPI Builder:

- DESFire Encoding plug-in
- Mifare Encoding plug-in
- Java Card Encoding plug-in
- HID card reading plug-in
- Integrated the PCSC protocol for encoders plug-in
- ISO 7816
- ISO 14443 A & B

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Layout Component

The Layout Component is a low level COM component that understands commands in the DGN file to draw images on the card in the printer. It is called by the Layout Design ActiveX to render the card.

Barcodes and Plug-ins

The bar code COM manages different types of bar codes and how to render them. It also has a plug-in interface to allow IWS EPI Builder to add new bar codes. ImageWare has added bar code plug-ins to support storing binary data on PDF417 and 2D bar codes.

Biometrics Component

The Bio Manager uses a plug-in architecture to support biometric hardware and software from various vendors using the same programming interface.

Bio Manager

The Bio Manager object manages biometric operations such as data capture, verification and identification.

BIR (Biometric Information Record)

The Bio Manager interacts with the BIR to load and save a BIR. A BIR is a template that describes the biometric type and format. A specific BIR implementation is required for each biometric vendor.

The Bio Manager can use the Capture Component to capture an image that calls the BIR component to generate a template for the image. This template could be accessed by the Bio Manager and passed to a server component that compares the captured template to a collection of stored templates to determine if there are similar people matching the captured image.

Biometric Plug-ins

ImageWare has currently developed EPI Builder plug-ins to do 1:1 biometric matching, such as facial matches, fingerprint matches, Iris matches and others. Contact your ImageWare Sales Representative for a current list of biometric plug-ins. Custom plug-ins may also be developed by ImageWare.

Configuration Components

GAAliases Component

A GAAliases object is a collection of field name aliases that have been defined for the IWS EPI Builder configuration database. The IWS EPI Builder configuration database includes all information necessary to run IWS EPI Builder and manage card data. GAAliases enable the user to refer to fields in the database with user-friendly names, as well as control which fields are visible to the user. For example, a card format could be referred to in your application as a passport layout page.

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A GAFieldSet object contains a collection of named data values. Each name/value pair in a GAFieldSet is a GAField object. The data value of the GAField object is a variant that may contain any type of data. It is used to transfer data between the application and the IWS EPI Builder components. The interface for this object is supported as both a regular COM and a dispatch interface.

Note: Other SDK support components will also be installed but are not directly callable by the application.

Config Component

The Config component keeps track of various settings and configuration data used in IWS EPI Builder. The Config Component is mainly used internally by IWS EPI Builder, but an application can call the Config Component methods to change the way this data is stored.

By default, the Config Component stores IWS EPI Builder settings in a fixed location in the registry. This means that different applications on one computer will share the same IWS EPI Builder settings for things such as image capture profiles and user preferences.

An application can keep its own separate set of IWS EPI Builder settings and configuration data, either in the registry, in a file or using some other storage method such as a database. The application can tell the Config Component where to read and store its data by using the SetConfigFile or SetConfigRegistry methods. The application can also use the ConfigData property to get and set the Config data in order to implement some other way of storing the data (in a database, for example).

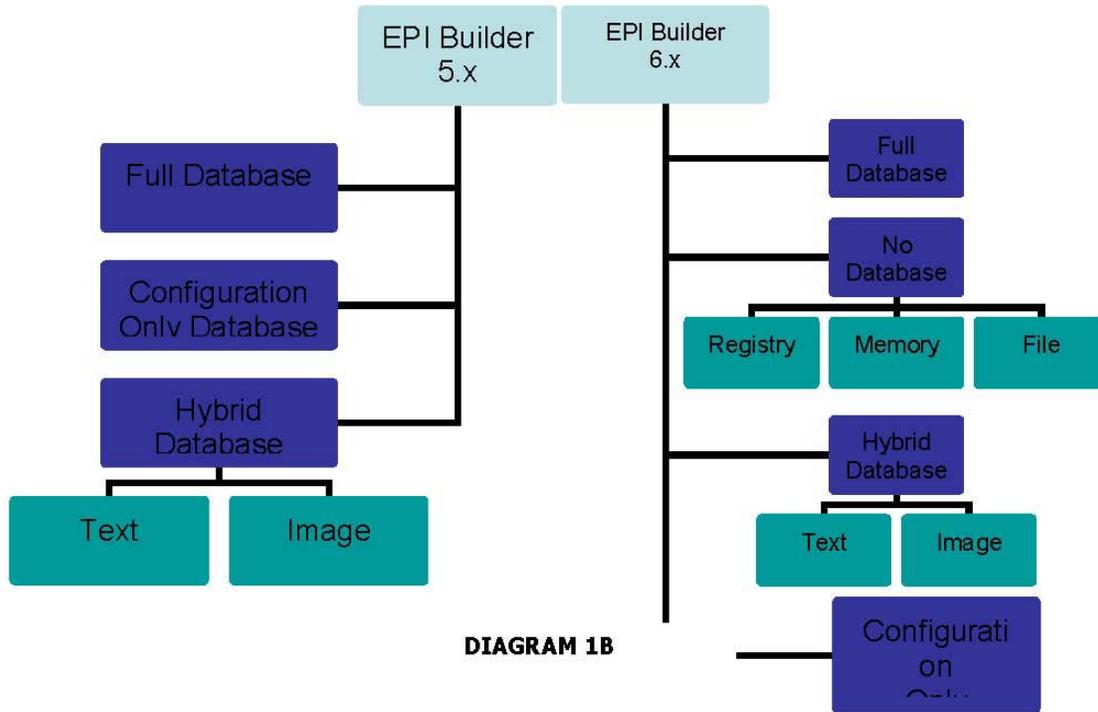
Note: An application does not need to use the Config object at all if it doesn't need to keep its own persistent settings for the IWS EPI Builder components.

How does IWS EPI Builder integrate with your application?

IWS EPI Builder uses a database to store images, card data and configuration information. An application can also use IWS EPI Builder to capture images and print cards without storing data, configuration information or images in the database, but in IWS EPI Builder 5.x versions the configuration information was always stored in the database.

With IWS EPI Builder 6.x, the configuration information can be stored in the registry, in memory or in file. This means developers no longer need to install the JET database with an application to manage IWS EPI Builder configuration data. But, for those customers who used the database to store configuration information this mode of operation has been maintained. The preferred method of operation for most developers will be the true “no database” mode where IWS EPI Builder configuration is stored in the registry, memory or in a shared file.

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Database Connection Models

When IWS EPI Builder is used to print cards, the data and images on the cards can be stored in the database (SDK database) and accessed directly by the SDK. Alternatively, the data and images can be stored and managed by the application and passed to the SDK as cards are printed. Various combinations of card data and image storage are supported, as described in the following paragraphs.

Full Database Connection

The card data and images are stored in the IWS EPI Builder database and accessed directly by the IWS EPI Builder. When cards are printed, IWS EPI Builder loads the card data and images from the database. It is possible for the card data to be in a different database from the images by using a JET database for the SDK and attaching the card data tables as external ODBC tables. This connection model makes it possible for an application to add functionality to an existing system. For example, image capture and card printing functions can be added to a system with a pre-existing database of personnel data residing on an ODBC-compatible database server. IWS EPI Builder would use its own database to store images and load card data, with the card data coming from external tables in the ODBC database. The original ODBC application database would not have to be modified.

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Hybrid Database Connection

The user application stores either the card data or the card images in an ODBC/JET-compliant database that is accessible to IWS EPI Builder. The information that is not stored in an ODBC/JET-compliant database, and therefore not accessible to IWS EPI Builder, is supplied by the application. The two types of hybrid database connections are:

Textual Hybrid Database Connection

IWS EPI Builder stores card data in the IWS EPI Builder database. If images are used, the application passes them to IWS EPI Builder as required; IWS EPI Builder does not store images in its database. As with the full database connection model, the card data tables may be in the SDK database itself, or they may be attached to the SDK database as external ODBC tables. Card data is stored in an ODBC/JET-compliant database that is accessible to IWS EPI Builder. Images are maintained by the application and passed to IWS EPI Builder when required. The IWS EPI Builder Configuration database contains information pertaining to the type of images available, data locations, primary and foreign keys and data field name aliases. When using this database connection type, the card layout information is stored according to IWS EPI Builder specifications.

Image Hybrid Database Connection

IWS EPI Builder stores images in the IWS EPI Builder database. Card data is not stored in its database. If the application uses IWS EPI Builder to print cards, IWS EPI Builder loads the images directly from its database, but the application passes the textual card data to the IWS EPI Builder. The IWS EPI Builder configuration database contains information pertaining to the type of images available and a list of card data tags that the application fills with data.

Configuration Only Database

Information will be provided by the IWS EPI Builder database and the card and image data will be provided on demand by the user application. The application maintains all card data and images and passes the appropriate data to IWS EPI Builder when required. The IWS EPI Builder configuration database contains information pertaining to the type of images available and a list of card data tags that the application fills with data.

No Database Connection

The SDK does not store or access either images or card data in the SDK database. Configuration information will be provided by the Config Component, and the card and image data will be provided on demand by the user application. This entirely eliminates the need for an IWS EPI Builder database. The application can use the SDK to capture, display and manipulate images as well as print cards using images and data supplied by the application.

Image Storage

When images are stored in the IWS EPI Builder database, there are many options available to the application to control how the images are stored. The images may be stored directly in the database as Binary Large Objects (BLOBs), or they may be stored in external files that are managed by the database. There is a variety of image file formats and compression options available. Each image in the database is identified by a key, which can be a value of any type. The key is usually configured to match the primary key of the card data table so that images correspond to cards. There may be several

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images of different types for each key value. For example, for each card in the database, there could be a photograph and a signature. Any number of image types can be defined by the application designer. IWS EPI Builder may be configured to store a small thumbnail version of each image. Use of thumbnail images speeds the display of images on screen.

Schema for Card Data Tables

IWS EPI Builder can be configured to print cards using card data from its database. There is great flexibility in the schema of the card data tables, so that IWS EPI Builder can be integrated into an existing database application. The card data can be contained in one or more tables. The configuration information in the IWS EPI Builder database specifies the primary and foreign keys that are used to join the card data tables. When a card is printed, the data is loaded automatically from the appropriate records of the card data tables. Images are also loaded using the same primary key that is used for cards.

Field Aliases

The IWS EPI Builder database configuration information includes a set of aliases for database fields. Aliases allow end users to see meaningful names for card data fields, instead of using the database table and column names, which are usually short and cryptic. When IWS EPI Builder is configured to print cards with data supplied by the application (not read from the database), a list of data field names must be defined to identify the data fields that are printed on the cards. The field names and aliases defined by IWS EPI Builder can be used by the application, as well as by EPI Designer when designing card layouts.

What types of applications can I develop with IWS EPI Builder?

Enterprise Remote Enrollment

Large organizations with many branch offices or mobile workforces may find it more cost effective to build custom Web applications to capture and store employee photographs instead of placing standalone ID systems in each branch office. This approach ensures that all enterprise ID information is controlled in a central location. With the Capture and Image Capture controls, developers can imbed functionality in a Web page to capture images from a variety of imaging devices including signature pads, cameras and fingerprint scanners at branch offices and store them on a central server. Other IWS EPI Builder features that are ideal for enterprise or remote solutions include:

- Face Finder Plug-in—automatically locates a face within an image then centers and crops it, ensuring a perfect photo every time
- Print Manager—extract employee images from the database and print them on virtually any ID printer
- Web Print—view and print IDs locally, but control data in a central database

FIPS 201 (PIV)

Personal Identity Verification (PIV) initiative results from the “Homeland Security Presidential Directive/Hspd-12”. The purpose of the PIV, and of its underlying standard (FIPS PUB 201), is to provide a common identification solution for the US federal employees and contractors that would permit to achieve a high level of security as well as interoperability across all government agencies. PIV addresses both physical access control to the US government facilities and logical access control to the US government information systems. Fingerprint images are stored as WSQ encoded images

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encapsulated in an INCIT 381-2004 data record, encapsulated itself in a CBEFF structure.

Compliance to the PIV will no doubt bring new complexities to an organizations Identification Management polices and procedures. EPI Builder will help to facilitate many of the required card management requirements and allow for a smooth integration of the PIV requirements with regard to card design, enrollment, biometric capture, encoding, and verification.

National Identification Systems

Building a National ID system is no trivial task—it can take months, even years to develop a comprehensive solution that securely issues IDs. IWS EPI Builder's components can cut months off application development and testing periods.

The key to issuing secure IDs is to start with a sound enrollment process that verifies the identity of the person to whom the ID is issued. IWS EPI Builder's integration with the ***IWS Biometric Engine*** can be used to capture a fingerprint, face or other biometric and search for that biometric data in a criminal database or a "watch list". The same principles can also be used to prevent the issuance of duplicate cards, which is crucial for documents such as driver licenses.

What makes IWS EPI Builder the solution of choice for the development of national ID systems is that developers need only develop application code once for a single type of biometric. Different types of biometrics from different vendors can than be easily substituted in later—all you need are new plug-ins for the new biometrics.

To speed the enrollment process for large volume applications like national IDs, IWS EPI Builder comes with a face finding tool that automatically locates a face within an image, then centers and crops it, during the photo capture process so users don't waste time manually cropping images. IWS EPI Builder also includes a direct interface to the Canon family of cameras to speed image capture through a simple user interface. The direct interface will help reduce wait times for people in line.

To address the security needs of a national ID application, IWS EPI Builder's design tool, EPI Designer, enables users to create cards with visible or invisible security features such as IR bar codes and store biometrics in a smart chip or 2D bar code. Ask your sales representative about ImageWare's custom encoder plug-ins.

Passport and Visa Issuance Systems

Passport and visa issuance systems require many of the same components as the national ID system described above. IWS EPI Builder enables developers to include biometric verification and identification into their passport and visa issuance systems and encode biometrics into a smart chip or 2D bar code in a passbook. Developers can also activate two or three-line OCRB documents with an ICAO plug-in. This plug-in also includes sample designs for passports, visas and TD1 and TD2-sized travel documents, along with an ICAO-compliant database. For Biometric capture and Encoding of the ICAO Data Groups such as DG1 (Face), DG2 (Fingers), and DG3 (Iris) are made easy by using the EPI Builder Capture Plug-Ins and the EPI Builder Encoding capabilities.

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Transit Systems

Whether building a transit application for buses, tramways, trains, taxis or parking lots, IWS EPI Builder can significantly streamline development

IWS has extensive experience developing e-purse applications, multi-application smart chips and hybrid multi-purpose cards. As a result, IWS EPI Builder's encoder framework was designed to enable developers to build plug-ins that will encode a card so that it can be read by multiple readers. An application like this might be used, for example, by a city whose light rail system uses a prepaid smart card that needs to be recharged in citywide vending machines that use magnetic stripes. With IWS EPI Builder, virtually any type of encoded or pre-encoded card can be developed to work with multiple readers for multiple purposes.

ImageWare has also developed direct interfaces to popular digital cameras to ensure that a new transit user is enrolled quickly. Furthermore, IWS EPI Builder's EPI FaceFinder automatically locates a face within an image, centers, crops it. This face finding technology not only ensures that photos are consistent in size and quality, but also eliminates the need to manually crop individual images, speeding the time it takes to process a card.

Developers will find that all IWS EPI Builder components can be imbedded directly into existing transit applications to ensure that all billing and payments can be processed through a single Web or client-server interface. IWS EPI Builder can even be used to search for duplicate records in the database and to prevent fraud or rider card swapping through its biometric capabilities.

Voter Registration Systems

An important security feature of any voter registration system is that it needs to prevent an individual from voting more than once. This can be difficult, particularly in countries that don't have the technical infrastructure that will enable them to verify a person's identity. IWS EPI Builder's biometric components enable developers to build biometric enrollment applications using fingerprints, iris scans or any other biometric to ensure that each person is uniquely identified before he is able to vote.

The voter registration application simply needs to store an individual's biometric data on a card in a smart chip or 2D bar code. When the individual arrives at the polling station, he has his fingerprint, face or other biometric data captured on site. His card is then swiped or scanned and the biometric data found on the card is then compared to the biometric data being captured live from the individual. If there is a match, the individual is allowed to vote.

Time and Attendance Systems

Time and attendance (TAD) system manufacturers need to ensure that employees don't clock in and out for other employees. By using IWS EPI Builder to add a photo ID and biometric verification to a TAD system, this problem is readily solved.

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Human Resources Systems

Human Resources (HR) often have the first contact with new employees. With IWS EPI Builder can be used to add photo image capture, card design and printing to any HR application. This additional functionality can increase the value of an existing HR system and make it easier for end-users to manage and deploy their ID badging applications.

Access Control and Facilities Management

Access control is all about keeping unwanted individuals out of a building. Some facilities management systems come with an access control component. IWS EPI Builder can be used to add photo image capture, card design and printing to any access control application.

To implement a decentralized access control system that does not require a central database to verify access information, IWS EPI Builder can also be used to capture and store a person's biometric data on chip imbedded in an access control card. When the cardholder approaches the door, he simply needs to verify his identity by running his card through a biometric reader. The biometry on the card is then compared against the actual biometry of person trying to enter the door. If there is a match, the person is allowed to enter the building. IWS EPI Builder components can also be imbedded into Web pages to provide a Web-based solution to capture images, and design, view and print access control cards.

Driver License Systems

A driver license system often involves custom workflow to ensure an ID is issued to the proper person. IWS EPI Builder's components can be used to create a secure and reliable driver license card production system. Furthermore, IWS EPI Builder's open architecture and various data connection modes make it easy to integrate with legacy data systems where existing driver information is stored.

IWS EPI Builder comes with a face finding tool that ensures that all images taken of drivers are consistent in size and quality. This eliminates the need to manually crop images and speeds card production times. IWS EPI Builder also comes with Web components that can be used to capture and send images directly from a camera at a remote driver license bureau directly to a central, secure site where card stock is tracked.

IWS EPI Builder also comes with sophisticated design tools that enable end users to create driver licenses watermarks and with perfectly aligned objects that may overlap one another or be hidden on the card. Biometric information can be added to cards and stored in 2D bar codes or magnetic stripes according to AAMVA encoding standards. And cards can be printed individually or in batches.

To prevent identity fraud or the issuance of multiple driver licenses to the same individual, IWS EPI Builder's biometric Capture components and the ***IWS Biometric Engine*** can be used to check for individuals with the same picture, but under different names.

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Entry/Exit Systems

IWS EPI Builder can be used to create a combined national ID and passport/visa issuance system to provide a highly secure entry/exit system that verifies individuals entering or exiting a country or crossing a border. IWS EPI Builder's biometric components can also be used to verify (1:1 matching) the identity of individuals crossing checkpoints. For a more robust identification (1:N searching) system the integration of the ***IWS Biometric Engine*** would add the necessary potency to a National Entry/Exit Systems.

Student Information Systems

Large colleges and universities issue ID cards to students to provide access to facilities, verify enrollment in courses and track meal plans. With IWS EPI Builder, components can be imbedded into a student information system to collect student images, design card layouts and print and encode cards during student registration. These student cards can be relatively simple and contain a simple bar code that is scanned and verified against a central student database or complex and contain a smart chip card that provides facilities access, meal cash payment and transit access.

Why do I need IWS EPI Builder?

Improve Time to Market

In today's competitive business environment it's important to leverage existing tools in the marketplace to provide comprehensive and timely ID solutions. IWS EPI Builder's open architecture allows developers to use familiar tools and easy-to-use components to implement an ID solution without have to derive ID functionality from first principles. As a result, IWS EPI Builder improves time to market by reducing learning curves and development cycles.

Address New Market Requirements Quickly

Product requirements change frequently—and often in mid-development. IWS EPI Builder's open architecture allows developers to quickly plug in new cameras, biometric devices, printers, bar codes, databases and encoders without having to recode the core application. In fact, biometric devices from different vendors can be substituted for one another or the type of biometric can be changed altogether (i.e. swap fingerprint for face).

To further accelerate the development cycle, ask your sales representative about ImageWare's custom services. ImageWare's technical team can build custom camera interfaces, integrate biometric devices, build or integrate your application or manage your project from start to finish.

Reduce Testing Time

The reality in today's ID world is that any large project or application must integrate with a number of image acquisition devices, databases, scanners and printers – each with its own idiosyncrasies. That's why ImageWare has dedicated resources to ensure that IWS EPI Builder works with the latest peripherals on the market.

For the latest list of compatible IWS EPI Builder products visit www.iwsinc.com .

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Note: If your project requires a peripheral that IWS EPI Builder does not support, please contact your ImageWare representative to discuss ImageWare's latest testing efforts and custom offerings.

Easy to Integrate

IWS EPI Builder's plug-in architecture allows developers to quickly add new peripherals without rebuilding their applications. An application can even be developed in VB where screen customization is a snap. Interfacing with other systems is easy – IWS EPI Builder is either provided with data from your application, a database or a combination of both. IWS EPI Builder also leverages industry-recognized standards such as BIOAPI, COM, ActiveX, XML, ODBC so programmers and security experts can use familiar interfaces.

Secure

IWS EPI Builder has been used to develop highly secure passport issuance, national ID, voter registration, common access card, driver license, and access control applications, among others.

Using IWS EPI Builder

This section gives an overview of how an application can use IWS EPI Builder. For complete documentation on using IWS EPI Builder, see the IWS EPI Builder component manual. This section will use the example of an application that calls IWS EPI Builder to capture images and print cards. This sample application is written using Visual Basic, with one main form. The application will use IWS EPI Builder to capture images from a video camera and store them in the IWS EPI Builder database. However, the textual data to be printed on the cards will not be stored in the IWS EPI Builder database. The application will manage the textual card data, and pass it to IWS EPI Builder when cards are printed. The card data may be stored in a database different from the one used by IWS EPI Builder.

This is an example of an image hybrid database connection model:

Configuring the SDK

The application designer must configure various aspects of the SDK for each particular application. This configuration includes:

- General database configuration – The sample application will use the SDK to store dynamic images in the SDK database, but not to store textual card data in the database.
- Dynamic image types – The types of dynamic images that are to be stored and printed must be defined. Each image type has properties controlling how they are to be stored. The sample application uses only one dynamic image type, a photograph of a person. These images will be stored in the IWS EPI Builder database, using JPEG image compression. A thumbnail image will be used for screen display.
- Card data schema – This is not required because the sample application is managing the card data without using IWS EPI Builder.

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- Card layout data fields – The card layout contains placeholders in which each card’s textual data is printed. These data fields must have names so that when a card is printed, the sample application can specify the data that goes in each field. The IWS EPI Builder configuration contains a list of the data field names. Most of these configuration settings are specified in configuration tables in the SDK database. The dynamic image type settings can be edited with a set of dialogs provided by the SetupImageTypesUI method of the EPI Database object. Full details of the IWS EPI Builder configuration are found in the IWS EPI Builder component manual.

Designing a Card Layout

The SDK prints cards using a card layout file that is created using EPI Designer. For this sample application, one card layout is used for all the cards that are printed. Each card has the name and picture of a person. These elements are dynamic objects because they differ from one card to the next, unlike a static object which appears on every card. The card layout includes the following elements:

- Static text and graphic objects such as a company’s name and logo
- Dynamic text data fields, including the person’s first and last names and an ID number
- A dynamic image object such as a photograph of the person

Initializing IWS EPI Builder

When the sample application starts, it must initialize the SDK and open an SDK database. Visual Basic code for this function may be similar to the following:

```
Dim TheEPIDB As EPISDK.IEPIDatabase  
Set TheEPIDB = New EPISDK.EPIDatabase  
TheEPIDB.OpenDatabase "JET;c:\TestApp\TestApp.mdb", hWnd
```

This example uses a JET/DAO database. The “hWnd” parameter in the OpenDatabase method is the window handle of the Visual Basic form window, which is used as the parent window for dialogs that may be displayed, such as a database login dialog.

Capturing and Storing Images

The sample application uses the Image Control ActiveX control to capture, display and store dynamic images.

- Each card has one dynamic image, a photograph of the cardholder. The application designer adds an Image Control Object to the sample application’s main form and sets the following properties of the object: Name - Give the control any desired name, for example, “ImageCtrl”.
- Image Type Connect String - Set to the same database connect string that is used when the application runs, for example, “JET;c:\TestApp\TestApp.mdb”. This property allows the Image Type property to be set to a valid image type.
- Image Type - Set to “Photograph”, the name that was given to the only dynamic image type used by this application.

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- Size To Thumbnail - Set to "True", so the size of the control will be the same as the size of the thumbnail images in the database.

When the sample application starts, the Image Control object must be given access to the Database object so that it can load and store dynamic images.

Visual Basic code for this function may be similar to the following:

```
ImageCtrl.SetDBSource TheEPIDB
```

To display the photograph in the EPI ImageCtrl control on the form, the sample application may use Visual Basic code similar to the following:

```
Dim setCardID As IGAFIELDSET  
Set setCardID = New GAFieldSet  
setCardID.Add "Card ID", cardID  
ImageCtrl.LoadFromDB setCardID
```

The variable "cardID" in the above code contains whatever value the sample application uses to identify a card. This value is passed to the LoadFromDB method using a GAFieldSet object because the image identifier used by LoadFromDB could be a composite key with several values, depending on the SDK database configuration. Full details of the IWS EPI Builder database configuration are found in the IWS EPI Builder component manual.

The sample application may use Visual Basic code similar to the following example to capture a dynamic image from a device such as a video camera, and save the image in the database:

```
If ImageCtrl.CaptureUI Then  
Dim setCardID As IGAFIELDSET  
Set setCardID = New GAFieldSet  
setCardID.Add "Card ID", cardID  
ImageCtrl.WriteToDB setCardID  
end if
```

As before, the variable "cardID" specifies the card whose image is being captured.

Managing Card Data

In this sample application, the application (and not IWS EPI Builder) manages the card data. The data printed on each card includes fields such as a person's first and last names and an identification number. The sample application stores this data in its own database. When the sample application saves a dynamic image in the IWS EPI Builder database, the value it uses to identify the image corresponds to a particular card in the application's card database.

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Printing Cards

The sample application prints cards using the Print Manager ActiveX control. The application designer adds a Print Manager Control object to the application's main form, but this object does not appear on the form when the application runs. The reason for putting it on the form is so that the sample application can handle events that are triggered by the Print Manager Control. When the sample application starts, the Print Manager Control object must be given access to the Database object so that it can load and store images.

Visual Basic code for this function may be similar to the following:

```
PrintManager.SetDBSource TheEPIDB
```

In this example, the SDK is configured to store images in its database, but let the sample application manage the card data. Therefore, when a card is printed, the Print Manager Control loads the photograph from the IWS EPI Builder database automatically, but it must get the textual card data fields from the sample application. The EPI Print Manager Control does this by triggering ActiveX events, requiring a response from the sample application.

The sample application must handle the following events:

- Get Layout File Name – As cards are not stored in the database, the SDK must ask the sample application which card layout to use to print each card. The sample application is configured to print only one type of card, so it always returns the same file name in response to this event.
- Get Card Text Data – This event requests the data fields for a particular card. The Print Manager Control passes the card ID of the card being printed, and the application loads the data for that card and returns it in a GAFieldSet object.

To print a single card, Visual Basic code may be similar to the following:

```
Dim setCardID As IGAFIELDSET  
Set setCardID = New GAFieldSet  
setCardID.Add "Card ID", cardID  
PrintManager.PrintCard setCardID
```

As before, the cardID variable specifies which card to print.

What do I need to run IWS EPI Builder?

Development Workstations

When developing an application, please be sure to order adequate runtime licenses to properly test the application. You will need the following to develop your application:

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Hardware

- Minimum IBM PC or compatible Pentium II 400 Mhz
- 128 MB RAM (256 MB recommended)
- CD-ROM drive
- 50 MB free hard drive space for IWS EPI Builder (approximately 15 KB per image for the database and 5 MB temporary storage)
- 256 color or higher SVGA graphics adapter
- SVGA color monitor with 800 by 600 screen resolution
- 101-key enhanced keyboard & mouse
- Optional frame or video-grabber board. Must be compatible with Video for Windows or TWAIN and the SVGA card
- Optional Olympus C4000Z digital camera if using the direct interface

Operating System

- Microsoft Windows 98 SE, Windows NT 4.0, Windows 2000 or Windows XP Pro

Database

- An ODBC 3.0 or JET 4.0-compliant database management system (optional)

Development Environments

- Microsoft Visual Basic 6.0
- Microsoft Visual C++ 6.0
- Microsoft ASP 3.0
- Microsoft Visual Studio.Net (VB, C++, C#, ASP)
- Delphi 6 and 7

Image Capture Devices

- Any Video for Windows-compliant video or frame grabber board and supported camera
- Any TWAIN-compliant device
- Any Wintab-compliant device
- File system mountable imaging devices
- Consult for the latest image capture devices tested with IWS EPI Builder

Printers

- Any Windows-compatible card, video or document printer
- Consult www.iwsinc.com for the latest printers tested with IWS EPI Builder

Application Workstations

Any application station hardware and software requirements will depend on the application. The basic runtime environment is the same as the environment for the development workstation (described above).

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How is IWS EPI Builder Licensed?

IWS EPI Builder Runtimes

IWS EPI Builder includes four runtime versions that can be deployed with your application. Runtimes are tracked by ImageWare's licensing server. There are no keys to track, customers to poll or lists in manufacturing to keep – we do it all for you electronically.

IWS EPI Builder is ideal for OEMs and system integrators who want better control over license tracking. Integrators and OEMs purchase developer licenses, create their applications and use IWS EPI Builder runtimes to run the applications. An EPI Designer license and runtime serial numbers will need to be purchased for each person who will be responsible for the design aspect of your application.

When you deploy an application, your customers will activate their IWS EPI Builder runtimes with the ImageWare activation server via the Internet or telephone.

IWS EPI Builder Full Runtime Seat

This serial number permits IWS EPI Builder applications to capture images, find faces, view and save images as well as print and encode cards. It will not allow the application to design card layouts.

IWS EPI Builder Capture Runtime Seat

This serial number permits IWS EPI Builder applications to capture images, find faces and view and save images. It will not allow the application to print, design or encode cards.

IWS EPI Builder View Runtime Seat

This serial number permits IWS EPI Builder applications to only view images. It will not allow the application to print, design or encode cards.

IWS EPI Builder IWS EPI Designer Seat

This serial number permits your application to design card layouts.

IWS EPI Builder Plug-ins

This serial number will activate specific plug-ins that add functionality to IWS EPI Builder. Plug-ins are also available in evaluation mode. Available plug-ins include:

- PDF417 2D Bar Code Plug-in
- Datastrip 2D Bar Code Plug-in
- Face Finder Plug-in
- ICAO Travel Documents Plug-ins
- Canon Camera Plug-ins (A70, A75, A80, A85, A95, A510, A520, G3, G5, G6)
- Live Scan Device Plug-ins (Identix TP3000, TP3800; CrossMatch ID1000/ID500/ID2500; Smiths Heimann Ue-Lite, Xe-Lite, Lscan-1000P)
- Finger Print Capture Plug-ins (Identix 2090 Series; CrossMatch Verifier Series; Heimann Single Finger Scanner ACCO1394; BioScript V Series; UPek; Precise Biometrics)
- Other Biometric Plug-ins (Contact your sales representative for a list of current plug-ins)
- Smart Card Encoding Plug-ins (Contact your sales representative for a list of current

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plug-ins)

Please visit the ImageWare Web site at www.iwsinc.com for the most current information on available plug-ins.

IWS EPI Builder Evaluation Kit

IWS EPI Builder can be evaluated for 30 days. Simply download the kit from ImageWare's Web site at www.iwsinc.com or request an evaluation kit on CD from your sales representative. With the evaluation kit, you will receive a serial number to activate:

- The development application that includes all IWS EPI Builder components and documentation
- Complete card layout and design functionality
- A runtime to test your deployed application

Note: the word "sample" will print on each card.

Once you receive your evaluation kit, activate the licenses provided. During installation, activate the Developer License when prompted. After installation, activate your Runtime and Designer Licenses. To do so, go to "Start/Program Files/EPI Builder Developer Kit 6" and select either "Activate EPI Builder Runtime License" or "Activate EPI Designer License" to open the Client License Manager.

IWS EPI Builder Software Developer's Kit

To continue your development once the 30-day evaluation period has ended, call your sales representative to purchase IWS EPI Builder. Please note that all existing work will be saved and the software does not need to be reinstalled. Simply enter the new serial numbers and reactivate your IWS EPI Builder Developer License, designer application and runtime. If you need to move IWS EPI Builder to a different machine during the evaluation or development stage, you will need to revoke the license(s) on your old machine and reactivate the license(s) on the new one.