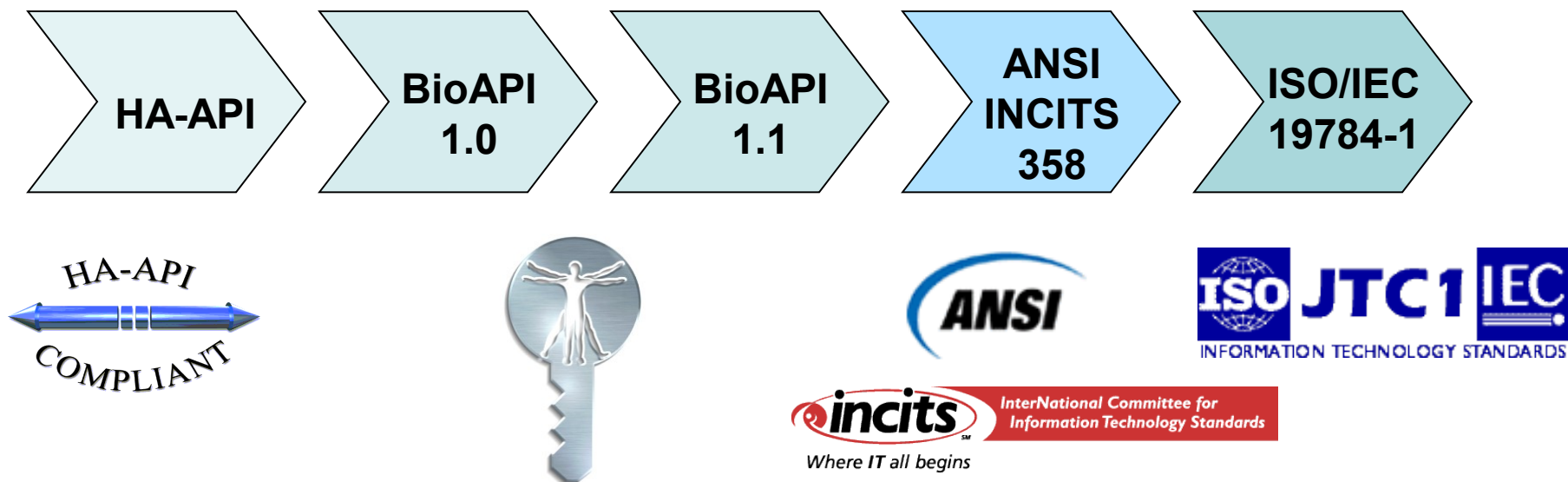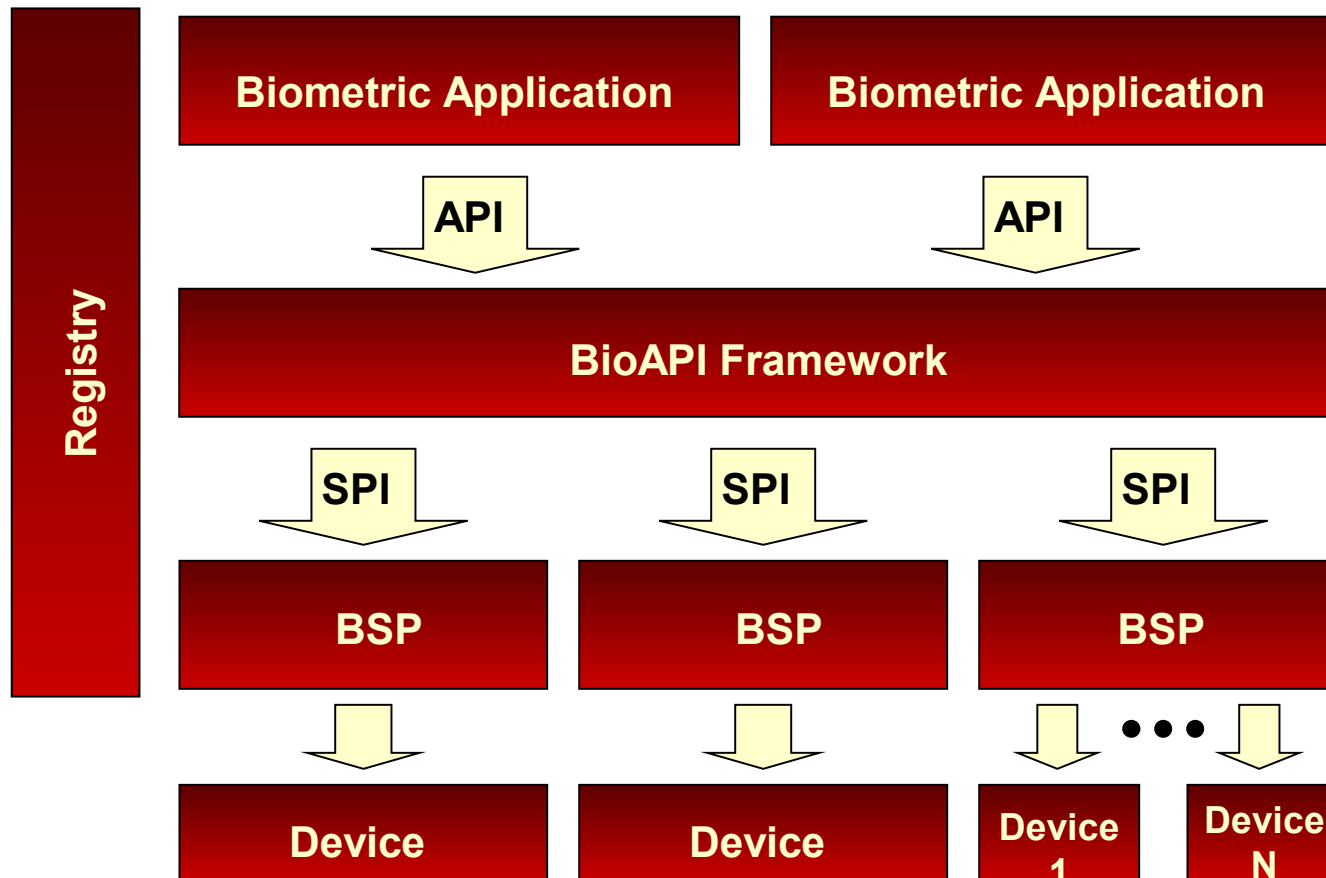# BioAPI

6 March 2009

Catherine Tilton

BioAPI?

- The BioAPI Specification defines an open system standard application program interface (API) that allows software applications to communicate with a broad range of biometric technologies in a common way.

- Evolution

BioAPI architecture

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BioAPI functions

Biometric Operations

Database Operations

Unit Operations

Component Management Functions

Data Handle Operations

Utility Functions

Callback & Event Operations

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Biometric operations

BASIC FUNCTIONS

- **Enroll User**
  - **Enroll**
    - Creates template (stored in user account DB and/or BSP DB)
- **Verify asserted identity (1:1)**
  - **Verify**
    - Live input matched against one stored template
- **Discover User's identity (1:N)**
  - **Identify**
    - Live input matched against set of stored templates
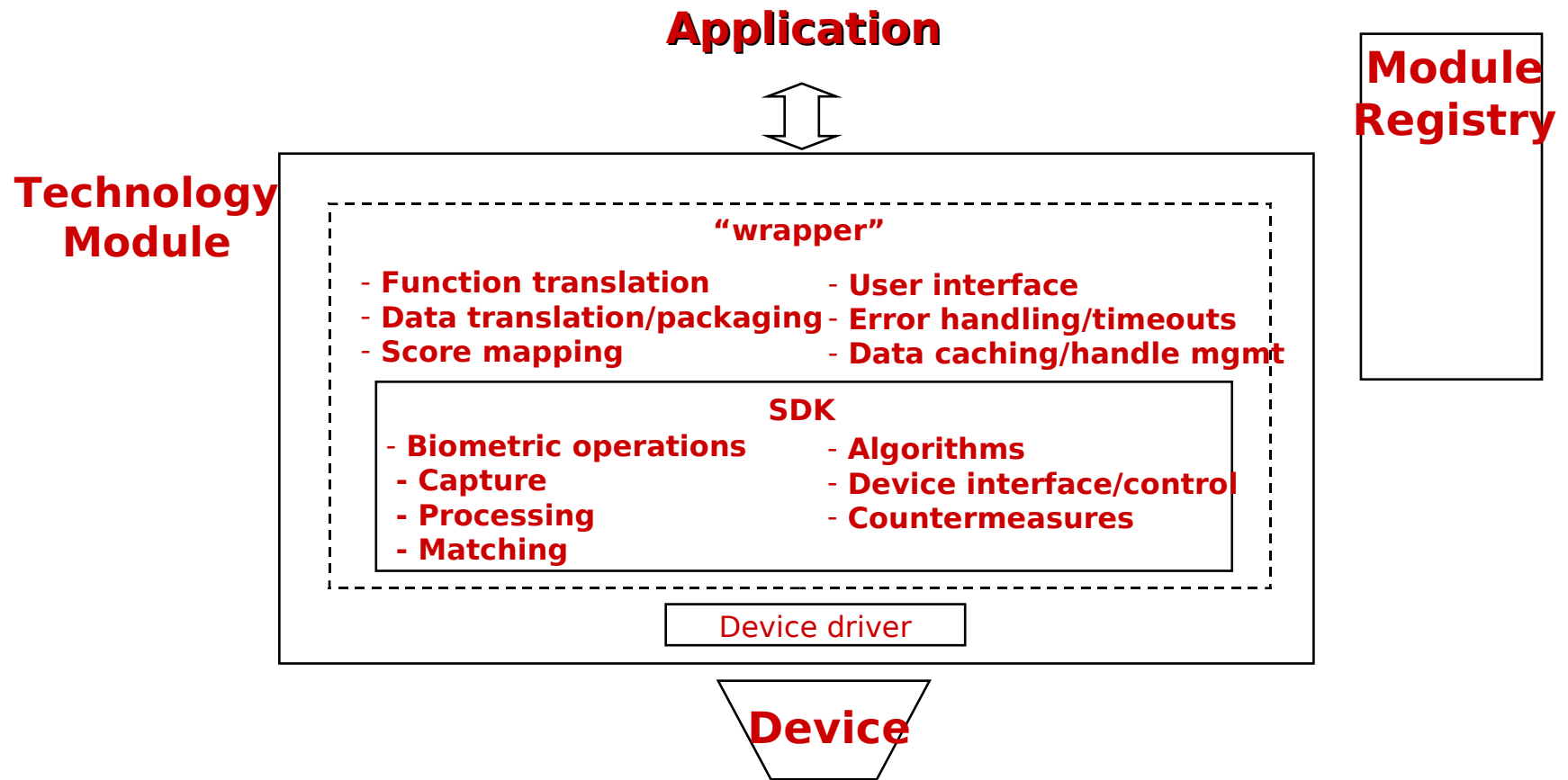
PRIMITIVE FUNCTIONS

- **Capture**
  - Captures biometric data from sensor
- **CreateTemplate**
  - Creates enrollment template
  - NewTemplate can be an adaptation of a StoredTemplate
- **Process**
  - Converts "intermediate" to "processed" BIR for matching
- **Process with Aux BIR**
- **VerifyMatch**
  - Performs 1:1 match
- **IdentifyMatch**
  - Performs 1:N match against specified DB
- **Import**
  - Imports non-real-time data for processing

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BioAPI features

- **Standardizes functions** PLUS
  - Platform independent
  - Standard biometric data record format (CBEFF)
  - Normalizes scoring & thresholding
- **Rich feature set** supports:
  - Client/server implementations
  - Model adaptation
  - Application control of GUI
  - App or BSP/internal database options
  - Data payloads
  - Configuration flexibility through basic and primitive operations

- **Optional capabilities**
  - Return of raw/audit data
  - Return of quality
  - Application-controlled GUI
  - GUI streaming callbacks
  - Detection of source presence
  - Payload carry
  - BIR signing
  - BIR encryption
  - Return of FRR
  - Model adaptation
  - Binning
  - Self-contained device

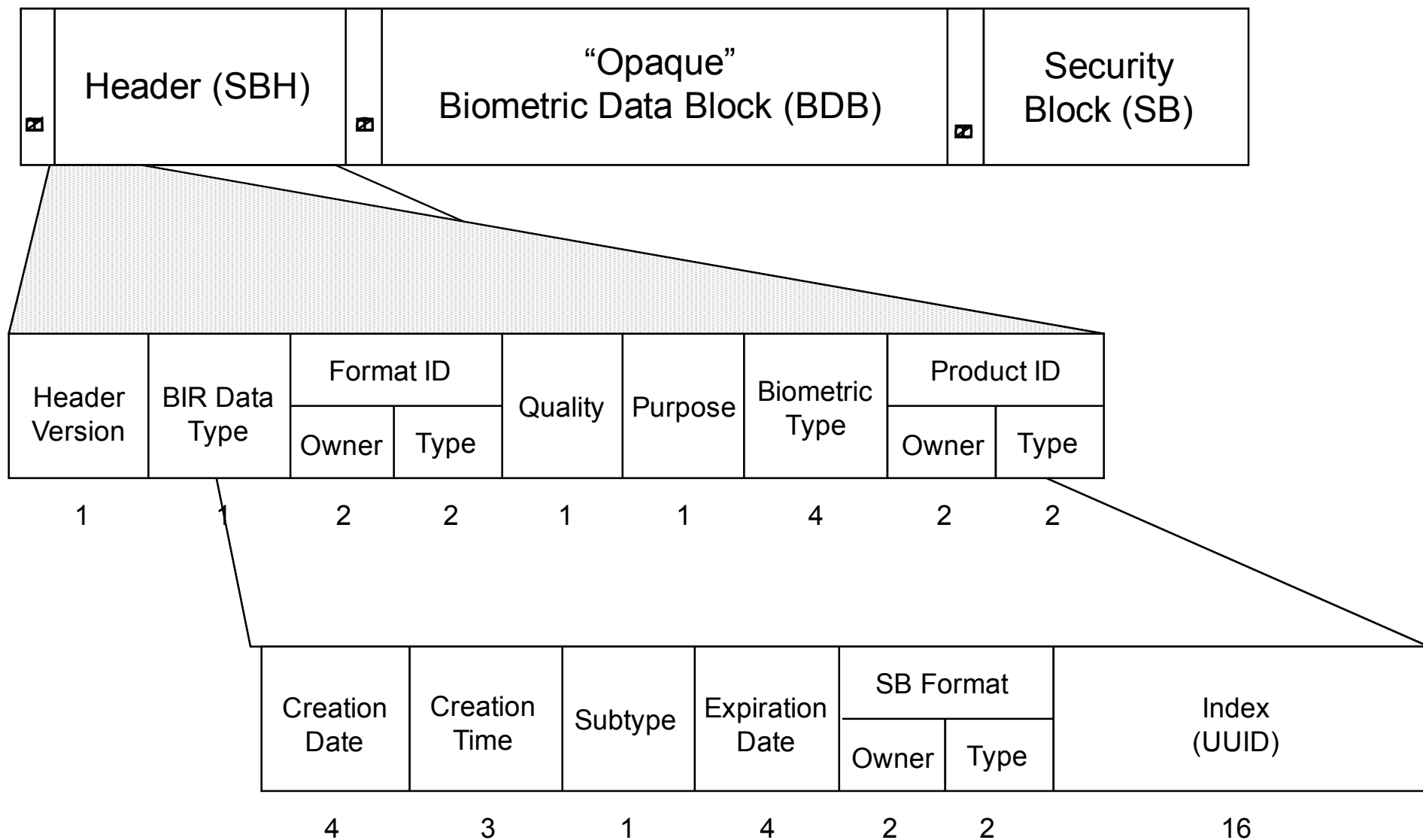**Daon**

Technology modules (BSPs)

- Technology modules instantiate the service provider interface, biometric algorithms, and device interface (currently monolithic)
- Provide biometric services to applications
  - Biometric "engine"
  - Biometric service provider (BSP)
- Can be distributed between platforms (i.e., client/server configuration)
- Generally responsible for user interface (GUI), as default
- May encompass one or more technologies
- Typically implemented as a "wrapper" around an existing SDK
- May use proprietary or standard data formats (must be registered)
- May support 1:1, 1:N, or both
- May include an internal or BSP controlled database
- May be instantiated in software or a combination of software & hardware
  - May be a self-contained device
  - May be a "combo" or "hybrid" device
  - May use a dedicated or commodity device

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BSP

Application

Module Registry

Technology Module

"wrapper"

- Function translation
- Data translation/packaging
- Score mapping

- User interface
- Error handling/timeouts
- Data caching/handle mgmt

SDK

- Biometric operations
  - Capture
  - Processing
  - Matching

- Algorithms
- Device interface/control
- Countermeasures

Device driver

Device

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(Framework) Reference Implementation

- BioAPI runtime software
  - Middleware framework between BioAPI compliant application and BioAPI compliant BSP
- Major functions:
  - Module loading/attaching
  - Module management
  - Module registry
  - Call passthrough/API-SPI translation
- Components
  - Framework, MDS
  - Password BSP (sample)
  - Sample app/exerciser
  - Installers

- Written in C, Win32 implementation
- Based on proven CDSA HRS code base
- Code portable to other environments
  - No OS specific calls
  - Port library / file system access
- Open source/public domain
- Downloadable from web

- Versions (V1.1): Win32, Linux, Solaris, WinCE

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BioAPI BIR

Header (SBH)		"Opaque" Biometric Data Block (BDB)		Security Block (SB)

Header Version	BIR Data Type	Format ID		Quality	Purpose	Biometric Type	Product ID	
		Owner	Type				Owner	Type
1	1	2	2	1	1	4	2	2

Creation Date	Creation Time	Subtype	Expiration Date	SB Format		Index (UUID)
				Owner	Type	
4	3	1	4	2	2	16

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BioAPI related projects

- US version
  - Fusion amendment
  - Conformance Test Methodology
- ISO version
  - Part 2: Archive Function Provider Interface (FPI)
  - Part 3: BioAPI Lite
  - Part 4: Sensor FPI
  - Amd 2: Security
  - Amd 3: Frameworkless
  - Conformance Test Methodology (4 parts)
  - Java version*
  - Tenprint capture using BioAPI
  - BioAPI Interworking Protocol (BIP)

*US projects based on v2.0

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Tools

- Win32 framework reference implementation
- Linux/Solaris reference implementation
- WinCE reference implementation
- JNI wrapper, C# wrapper
- PAM interface
- Conformance test suites
- BioAPI Helper
- Best practices document (draft)
- Website
- Developers listserve

`www.bioapi.org`

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Thanks!

For your attention!

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