# Hardware Layout Design, Development & Porting of SDK Modules, Application Design & Development and Testing for a leading Biometric Sensor Manufacturer – Validity Inc.

## The Client

Validity Sensors, Inc. develops the world's most durable, flexible and highest performing biometric fingerprint sensors for communication and information devices targeted at the PC, mobile, portable media and access control markets. Validity's biometric security products enable a wide range of convenient features including password replacement, identity verification, centralized management for corporate network security, secure wireless transactions, protection of portable data, and access control.

By providing convenient, secure, and reliable fingerprint authentication biometric solutions, Validity continues to meet or exceed the demands of its customers in corporate and consumer PC product and mobile device markets. With Validity's patented LiveFlex® technology, Validity is able to meet the ever increasing requirements for durable and reliable solutions. This is why the world's top 2 notebook PC OEM's are using Validity solutions.

## Business Situation

Validity Sensors Inc. needed that 'time to market' of their fingerprint sensor products is optimized in a cost effective way to be able to emerge as a leader in the growing market of biometric sensors. For this, Validity was in search of a development partner who would support them on various fronts - right from creating hardware layouts for their customers, developing various modules of Validity's host SDK software, porting the SDK to embedded platforms and developing various applications for the software suite.

Aftek Ltd., having experience in full spectrum technology services like development of hardware, firmware and application, was an ideal match for this assignment.

## The Challenges

One of the key projects that Aftek worked on for Validity, included replacing an earlier flash file system, which was unable to protect data during power interruptions and poor in response time and needed to be portable across various PC and embedded platforms.

Another challenging task included porting of the SDK including SPI driver and associated applications to embedded platforms in a short time span.

Also, Sensor Hardware Layout Design project had very less ramp-up time, stringent quality standards and squeezed timelines while creating the Reference and Customer Design Kits for Validity sensor products.

Designing a friendly, intuitive and portable user interface for the Demo Application and Diagnostic Tool, which were to be part of the Software Suite, was also crucial.

## The Contribution

Aftek acted as an extension to client's design, development and testing teams. While main contribution was towards adding new modules and applications in Validity SDK, porting it to embedded platforms, Aftek also supported Validity in sensor hardware layout design. collection of .

### Flash File System

Aftek's portable FFS (flash file system - Aftek's IP) protects data on flash memory against power failures and has an excellent response time. The FFS was optimized for Validity's specific usage pattern, where the fingerprint data is occasionally written but frequently read for verification and identification. Aftek's FFS was integrated in Validity's SDK to replace an earlier file system. The operations with new FFS were noted to be around 500 times faster than with earlier file system.

Aftek's flash file system provides following major features:

- Provides most standard file and directory operations
- Data protection against power failure
- Implemented as a portable ANSI C library
- Offers design flexibility for third party integration

### Porting SDK on embedded Linux

Validity provides SDK to its customers to develop solutions based on its fingerprint sensors. The SDK is available for Windows and Linux based x86 systems. Aftek helped Validity to make this SDK available on embedded platforms.

Aftek's contribution included:

- Porting Validity's SDK and open source USB host implementation to PXA-270 embedded Linux 2.6 based platform.
- Porting SPI sensor driver to PXA-270 embedded Linux 2.6 based platform and integrating it with the SDK.
- Writing test applications and testing of the ported SDK.

### Hardware Design Layout

Validity provides reference design kit for each of its fingerprint sensor variant. Also, Validity provides support to customize the sensor modules as per customers' mechanical usage requirements. Aftek helped Validity in developing the reference kits and customized kits.

Aftek's contribution included:

- Creating board layouts for multiple reference design kits
- Creating board layouts for multiple customer design kits
- Review of Validity's layout design

## Validity Demo Application

Demo Application is part of Validity's software suite. It demonstrates usage of Validity SDK API. Demo Application enables the user to Enroll by swiping his finger(s) on the attached Validity sensor. It also supports Verification of an enrolled finger and Identification of the user from a fingerprint. It provides visual feedback for every finger swipe and displays the captured fingerprint.

Aftek's contribution included:

- Design and development of a platform independent ANSI C library containing the application logic
- Design and development of GUI in Java which interfaces with the underlying C library using JNI
- Functional and load testing of integrated application on various Windows as well as Linux platforms.

## Validity Diagnostic Tool

Diagnostic Tool is also a part of Validity's software suite. It runs various diagnostics tests to check all components of the software suite and parameters of attached fingerprint sensor. Diagnostic Tool reads configuration files providing details and tests to be conducted for each software release and sensor model. It generates a report file with the results of various tests.

Aftek's contribution included:

- Design and development of a portable library containing the application logic
- Design and development of user friendly GUI
- Functional testing of integrated application

## About Aftek

Aftek Limited is a full spectrum technology services company from India. Over last 20 years Aftek has gained significant exposure to variety of technologies. Rich technological capabilities, focused investments in Research & Development and industry exposure enables us to reach beyond the basic IT services to design and deliver projects, products and implement end-to-end solutions to customers in variety of industries. Our service sepctrum covers key services as Application Development, Application Maintenance, Hardware Development, Firmware Development, Embedded Systems and Testing Services.

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