How Fingerprint Readers Work

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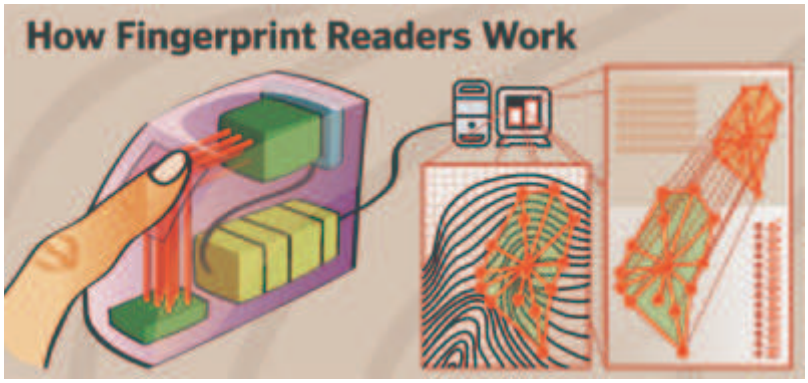
The first fingerprint readers used *optical* scanners to confirm identity. When a finger is placed on a scanner's coated plastic window, a *charge-coupled device* (or CCD) records an image of the fingerprint as dark ridges and light valleys, and an analog-to-digital converter transforms that picture into a digital signal. Then the system either confirms identity (in a one-to-one lookup) or ascertains it (in a one-to-many lookup) against a database of users.



A few devices use newer silicon technology to record prints. In these *capacitive* units, esensors use the human body's natural electrical charge to measure the difference in potential energy between ridges and valleys in a fingerprint. This is also how they can tell whether the finger is "live."

None of these devices record actual fingerprints; they record the distances betwen ridges, valleys, and *minutiae*--the intersections of the lines in a fingerprint--and create a template based on that set of data points. Most devices send this information to the database for comparison after encrypting the data.