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Biometric System-on-Cards



Biometric system-on-card

Use cases

A broad range of applications

Payments



Healthcare



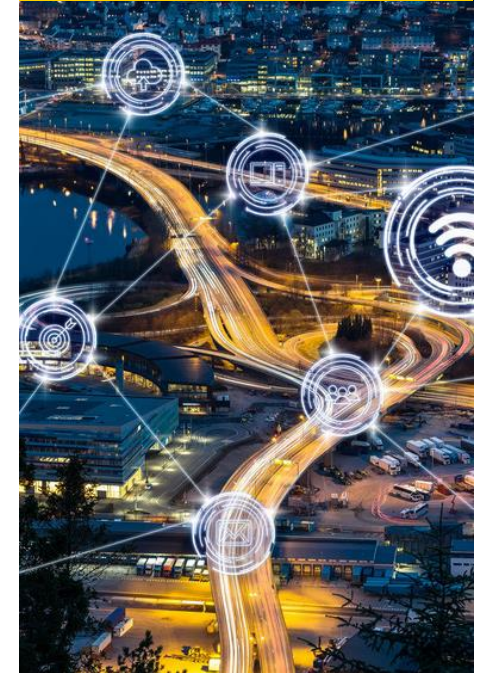
Access control



Government



Internet of Things



Biometric system-on-card (BSoC)



Market

- Estimated TAM for biometric payment cards: 40Mu in 2026 (ABI)
- Multiple application segments supported (banking, ID, Health, Access control)

A combined solution



Solution

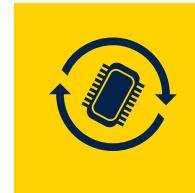
- Enhanced security & easy to use
- Unicity granted (Not transferable, Not duplicable)
- Suitable for PIN-less operations
Toll gate, health cards, contactless transactions
- Usable in conjunction with PIN code
- Easy to use
Multi platform technology, nothing to remember

Biometric system-on-card: key challenges

New technology with better performance fuels state-of-the-art product



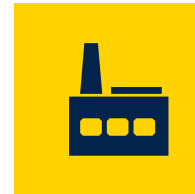
Market maturity



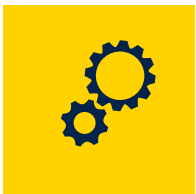
Card lifecycle



System interoperability & security



Card manufacturing



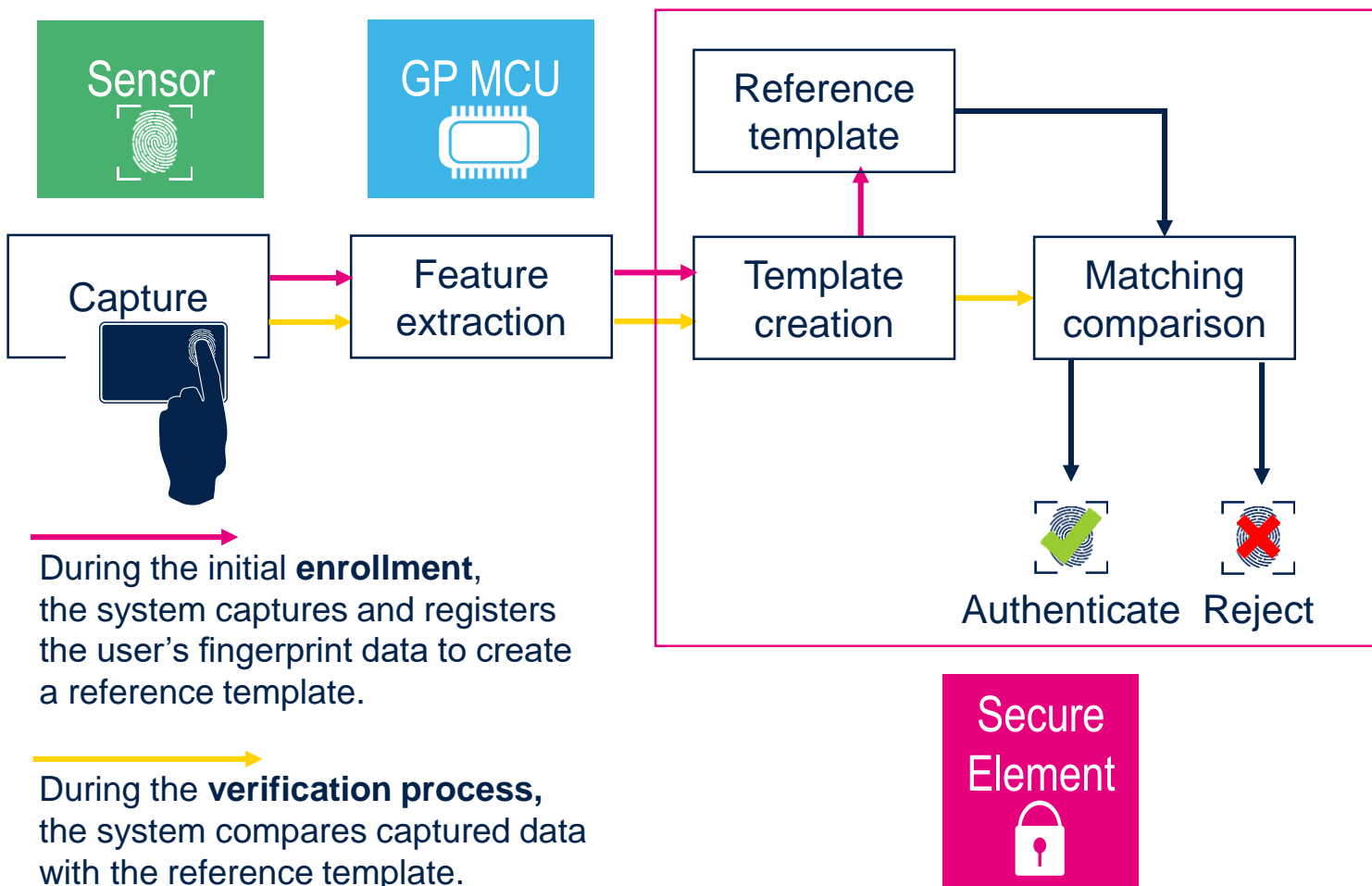
Technical requirements



Performance

How do Biometric SoCs work?

Match-on-card in 1 second



During the initial **enrollment**, the system captures and registers the user's fingerprint data to create a reference template.

During the **verification process**, the system compares captured data with the reference template.

4-step authentication process:

Capture: sensor captures the individual's biometrics during the enrollment

Feature extraction and template creation: a microcontroller⁽¹⁾ extracts the biometric data, thereby creating a reference template during the first enrollment or matching.

Reference template: reference data is securely stored in the Secure Element and used at each authentication to make the matching comparison.

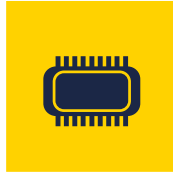
Matching comparison (match-on-card): template is compared to the reference to authenticate or reject the enrollment

(1) This operation can be managed by the SE when Single chip

Generic technical requirements



Sensor captures biometric images



GP MCU extracts data from sensor



Secure element master (transaction + matching)



Low-power system to be supplied in RF without battery

Ensuring a higher level of security

Ensuring a higher level of security

Enrollment

Fingerprint acquisition



In-Card template creation



Template stored in secure element or secure flash



Matching

Fingerprint acquisition



In-Card template creation



In-Card templates matching



- Biometric data are never transferred to an external terminal
- Granted unicity – neither transferable nor duplicable, lower risk of attacks

Biometric system-on-card (BSoC) solution

A payment authentication solution with power management system



STPay-Topaz-Bio

- STPay operating system
- Payment, Secure matching
- RF harvesting and Power domain management (battery-less solution without external Bill Of Material)

General purpose MCU STM32

- Data extraction

Sensors & packaging

- EMV module
- Inlay
- Fingerprint sensor

STPay-Topaz-Bio won
CES Innovation Award
2022



Our technology starts with You



Find out more at www.st.com/biometry

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