Making financial transactions using mobile near-field communication (NFC) technology is considered to be the next breakthrough in payments. The actual implementation, however, can be challenging and costly as the management of private credentials on a mobile device is complex.

The NFC secure element (SE) was originally considered as an environment in the mobile device where applications and credentials could be securely stored. The physical presence of an SE in the device, however, creates dependencies and complexities that make it difficult and expensive for actors in an NFC ecosystem to interact efficiently. For example, application issuers need to have arrangements agreed with different SE issuers, who in turn need to be able to connect with different types of mobile handsets. Additionally, procedures need to be implemented for the support, liability, distribution and replacement of an application once it is live in the marketplace.
By moving the SE to a remote environment, these intricacies and associated costs can be bypassed: application issuers can directly provision their applications to an SE without any third parties being involved. With this model, an application issuer is no longer dependent on the mobile device SE owner for storing credentials and instead has its own SE in a cloud environment. This offers independence and greater control.

**COMPARING SECURE ELEMENT TO HOST CLOUD EMULATION**

**ADDITIONAL SECURITY FEATURES**

On top of EMV security, ACI’s solution offers additional security features such as:

- Tokenization
- Per transaction challenge/passcode
- Use of dynamic personal account number (PAN)
- Client-side risk management
- Per card activation
- Registration and two (or multi) channel activation support
- Integration with existing mobile banking registration
- Per session passcode management

ACI also provides enhanced functionality through partner relationships to offer further security protection against interception, cloning and misuse of APIs.
WHY SECURE ELEMENT IN THE CLOUD?

INDEPENDENCE AND DIRECT CONTROL
No intermediaries are necessary to access the SE. This narrows the gap between application issuers and customers, ensuring a consistent brand and user experience across all available NFC services.

EASIER INTEGRATION WITH THIRD PARTIES
Being in control of the SE allows easy integration with any third-party provider and any business model. These include mobile network operators, NFC device manufacturers and trusted service managers (TSMs).

LOWER COSTS
SE integration in mobile devices is expensive and subject to SE domain fees. By deploying the SE in the cloud, the NFC value chain will be shortened, as fewer parties in the ecosystem need to be involved; this leads to lower provisioning costs.

GREATER SECURITY AND IMPROVED RISK MANAGEMENT
Direct access to the SE enables instant fraud detection and allows immediate blocking of an application. Additionally, the computing power of an SE in the cloud is higher than that on a mobile device; this offers the option for more advanced on-device risk management.

MULTIPLE CARDS, EMV APPLICATIONS AND PAYMENT SCHEMES
Storage capacity on a physical SE is limited. In the cloud, storage is scalable and can be expanded to meet individual requirements and to support any card, application and payment scheme.

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1. Real-time and/or batch file import of card and personalization data
2. EMV command and cryptogram generation (key management/HSM)
3. Secure connection
4. An ACI client API SDK allows for a smooth integration to existing (mobile wallet) applications
ACI SOLUTION OVERVIEW
ACI’s Secure Element in the Cloud, an international patent pending solution offered in partnership with Bell ID, emulates an EMV mobile payment via a remote SE and provides the functionality to complete an EMV payment transaction using a common and standard EMV contactless payment terminal. When a consumer makes a purchase, payment credentials are accessed from the remote SE. A response is then generated and communicated through the mobile device to the point-of-sale (POS) terminal. The data is presented in the same format as that used in standard EMV transactions and hence there is no impact on the acquirer’s side.

COMPATIBLE WITH EXISTING CONTACTLESS READERS AND POS TERMINALS
As the transaction emulates an EMV payment, no changes are needed to existing contactless terminals or the payments acceptance infrastructure.

ACI’s cloud optimization technology significantly reduces transaction times.

TRANSACTION OPTIMIZATION
Transaction times are optimized by minimizing the number of network round-trips for any application. Furthermore, non-sensitive data is already preloaded before the transaction takes place. Through ACI’s tokenization method, even faster transaction times can be realized.

WHO CAN BENEFIT?
Secure Element in the Cloud is suitable for any credential issuer that is looking for an effective approach to distribute and manage NFC credentials directly to its customers.

FINANCIAL INSTITUTIONS
Provide card present transactions for any customer with an NFC handset and have the flexibility to integrate payment functionality within existing mobile banking applications.

WHY ACI?
ACI has a strong heritage in payments, identity and mobile software credentials management. It uses this extensive market and technical expertise to develop solutions that meet the complex and evolving challenge of delivering mobile NFC transactions. With many implementations worldwide, ACI has proven global ability and has earned its reputation as a trusted partner.

ACI’s Secure Element in the Cloud is not a theoretical concept, but has already been deployed successfully as a proven solution.

KEY BENEFITS

EMV COMPATIBLE
The solution supports both international and domestic payment schemes that are based on EMV technology.

SUPPORT TRANSACTIONS WITH OR WITHOUT HOST CARD EMULATION
Transactions can be performed directly from the mobile device using host card emulation (HCE). However, this is not required when the physical SE (or legacy SIM) is used for authentication purposes.

MAKE TRANSACTIONS, EVEN WHEN NOT CONNECTED
Through the concept of tokenization, mobile transactions can be performed even when there is no connection to the server: the device safely holds pre-authorized transactions to enable a set number of payments, defined by the issuer.

ACI enables transactions even when no connection to the server can be made by pre-authorizing transactions.
## TECHNICAL OVERVIEW

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>EMV applications support</td>
<td>Any contactless or mobile contactless EMV scheme</td>
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<tr>
<td>Supported devices</td>
<td>Devices supporting NFC via HCE or single wire protocol/HCI</td>
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<tr>
<td>Supporting functionality</td>
<td>• Full connection and transaction flow distributed audit trails</td>
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<tr>
<td></td>
<td>• Template-based reporting engine for integration to mediation, billing and</td>
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<td></td>
<td>other reporting platforms</td>
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<td></td>
<td>• Platform-wide (including all interfaces) user rights management (URM)</td>
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<td>• Full web-based administration and configuration interface (with URM</td>
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<td></td>
<td>access control)</td>
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<td></td>
<td>• Notification engine</td>
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<td>• Language configuration</td>
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ACI Worldwide, the Universal Payments company, powers electronic payments and banking for more than 5,600 financial institutions, retailers, billers and processors around the world. ACI software processes $13 trillion each day in payments and securities transactions for more than 300 of the leading global retailers, and 18 of the world’s 20 largest banks. Universal Payments — — is ACI’s strategy to deliver the industry’s broadest, most unified end-to-end enterprise payment solutions. Through our comprehensive suite of software products and hosted services, we deliver solutions for payments processing; card and merchant management; online banking; mobile, branch and voice banking; fraud detection; trade finance; and electronic bill presentment and payment. To learn more about ACI, please visit www.aciworldwide.com. You can also find us on Twitter @ACI_Worldwide.