

# Fallback to Chip Payment Application

## An SPA's Position

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### 1. The cost of sophistication

In a bid to make consumers lives easier by delivering ever more intuitive and simple to use products, the underlying technologies needed to support these efforts are becoming ever more sophisticated. And with this increased sophistication comes increased risk.

Tablets are a great example. They're delightfully simple to use and offer consumers a seamless online experience. Time-saving applications take mere seconds to download, and the devices are as at home playing high definition movies during the daily commute as they are running diagnostic programs on the flights decks of the world's most advanced aircraft.

Although they rarely do, when tablets go wrong, no amount of tinkering by users will solve the problems. The sealed units are simply packaged up and sent back to the manufacturer.

Similarly, payment is becoming easier – on the card, the mobile or contactless. But the actual applications, underlying technologies and supporting infrastructures that enable these user friendly interfaces are likewise becoming more complex. And while users can live without their broken tablets, the same cannot be said for their payment cards and services.

Alongside contactless and mobile payment initiatives, the smart payment card is also increasing in sophistication. They now support a host of different payment and non-payment applications (ie. data storage). More lines of code being added in the chip to support the growing number of adjustable parameters needed to enable bespoke applications for issuers raises a host of new design, testing, deployment and maintenance challenges.

In some Western and Northern European countries like Sweden for instance, where chip & PIN penetration and usage levels are high replacing cash rapidly, payment is becoming more dependent than ever on chip technology; making the entire system vulnerable should a fault occur.

In this case, it is not acceptable for consumers to simply send their cards back to the issuer or wait around for a software fix. Card payments are too embedded into the fabric of everyday lifestyles. And that requires a fall back position that, in the event of a problem on the chip, is instantly available to allow the transaction to proceed at the point of sale.

Of course, in some regions lacking chip and PIN legislation, it's possible to default back to the magnetic stripe. But this sort of legacy security is rapidly being phased out. Indeed, under SEPA legislation in Europe it's not longer an option and there is no standard fall back option. And that's a problem.

## A decade of migration

Today's payments industry is characterized by change. New form factors are appearing, demanding a new ecosystem of advanced readers. Contact, contactless and mobile device payments are likely to feature an increasing array of branded payment scheme applications. Terminals, cards and devices are going to have to support legacy applications as well.

We'll see different applications and services being executed in different ways, with different levels of functionality, on differing platforms. As the industry suits up for a migration program to this new generation of smart payments cards (and its supported ecosystem), we have all the ingredients for interoperability incidents. And they'll need to be fixed fast.

## 2. Fault tolerance to Fall Back to Chip

Of course, the need to architect some kind of fall back solution is not limited to the payments industry. The wider technology sector industry has long faced the potential appearance of faults in the execution state of its programs. In response it has developed a host of mechanisms to improve the reliability of the embedded software.

Fault avoidance is the Holy Grail here, but constructing fault-free programs is a challenging, if not near-impossible, task. So vendors turned their attention to fault removal techniques, developing extensive testing software to disclose and remove faults. It is commonly accepted that even the best testing programs cannot guarantee 100% identification of all programming faults.

A more advanced design technique involves building fault tolerant programs that provide some code redundancy. This isn't a new concept. Fault tolerance programming is based around nullifying programming errors by using real-time redundancy, or static "emergency" subprograms to fill in for programs that crash. It's a well recognized protection mechanism: being used extensively to ensure a minimum level of system operation in areas where the maintenance of products is difficult to achieve in real-time (space, military, car industries).

And it's this kind of fault tolerant programming we need in the card payments space to avert the potential chaos threatened by our migrating market. To date however, it hasn't been widely adopted in smart card software.

That is not to say that the payments industry is slow to recognize and address problems. Inherent within the card creation and issuance process is an extensive functional and security testing procedure during certification – involving external, independent laboratories approved by the Schemes.

However, there's no doubt that more attention on fault tolerance will be critical as applications become more complex. A software error somewhere in the card payment operating system, or within the payment application itself, can lead to the transaction being rejected: with all the negative consequences for the issuing bank, brand, merchant and especially the cardholder. Clearly, such a scenario is to be avoided at all events.

Therefore, over 12 months ago, the SPA proposed the concept of a Fall Back to Chip mechanism to ensure basic payment functionality in the case of recurrent transaction failures. While functionality would be limited, this position would still preserve the security of the transaction and enable its acceptance. It would become, for example, a run-flat tire for the payments industry.

While action is being taken on fall back positions: most recently the German Banking Association, Deutsche Kreditwirtschaft, published new requirements for the country's ATM system that mandates support for chip fall back in the ATM from January 1st 2015 onwards. While this is encouraging news, the payments industry is global by nature, and therefore requires a global, standardized solution.

### 3. Standardization Scope suggested by SPA

Here, the SPA's Fall Back to Chip proposal is intended to provide that globally interoperable solution - overcoming the problems of functional card failures and the corresponding abortive transaction. In developing the concept, SPA has taken into consideration the interests of the different stakeholders involved in a transaction:

▶ For the acquirer

- The legacy terminal infrastructure should not be impacted by the selection of the Fall Back to Chip mechanism in the card

▶ For the issuer

- The issuer shall be the only entity authorizing the activation of the Fall Back to Chip mechanism
- Fall Back to Chip transactions shall be identified by the issuer
- Fall Back to Chip transactions should be a temporary solution
- The design of the Fall Back to Chip mechanism shall facilitate the complete testing of the software module that implements it

▶ For the cardholder

- The cardholder user experience shall be impacted to a minimum extent
- The access to a minimum set of payment services is guaranteed

▶ For the brand

- The rules governing the contractual business relationship with both issuers and acquirers shall remain unchanged

There are a number of ways in which to manage such a challenge – and these require final clarification with all the stakeholders within of the payment ecosystem.

The first solution envisioned is to implement the Fall Back to Chip as an independent application (as Scenario 1). The second is to have a specific path integrated into the application itself (as Scenario 2)

Both cases have their own opportunities and challenges in terms of ease of implementation, testing and maintenance constraints. Currently the SPA does not have a specific preference – believing the decision should be made by the brand.

However, from SPA's perspective, it is crucial to specify the interoperable mechanisms for the activation of the Fall Back to Chip at EMVCo level. These mechanisms should deliver the following in one or more steps:

1. Blocking of the failed application or profile(s)
2. Activation of the Fall Back to Chip
3. Relevant updates of the PSE / PPSE application

## 4. A proposal for the work to be done at industry level

Having already gained support for this proposal from EMVCo and the European Payments Council – Card Stakeholders Group (EPC-CSG), the SPA believes that the smart payment cards industry must take the lead on developing the suitable Fall Back to Chip application, based on the following:

1. The development of an interoperable switch mechanism for the two cases to ensure the mechanism is supported by the host of the issuer and bespoke to any vendor
2. An analysis of the potential impact on the certification process
3. An analysis of the potential impact on existing payment application specifications
4. An analysis of the impacts on functional test for Level 2 Card Type Approval

This position was communicated to EMVCo and the EPC-CSG in 2012. It has been welcomed by both organizations and retained in the business requirements of the EMVCo Next Generation Taskforce. For the SEPA area, SPA and other payments industry stakeholders will formally propose to the EPC-CSG the establishment of a standardization program following the publication of the Volume Book of Requirements v7.0.

## 5. Pressing need for action

Quite apart from the well understood need to avoid both the reputation and financial consequences of a potential fault within the smart card chip, the industry has a very particular duty of care to its issuing customers and their users. As we migrate to a new generation of cards, the risks are set to increase and the possibility of a 'perfect storm' failure becomes real.

It is crucial therefore that the industry acts to establish a wide-ranging Fall Back to Chip program; developing an application, taking it to the prototyping stage and then testing interoperability within the EMVCo environment.

The SPA is fully supportive of any moves in this direction and will continue to offer advice and support, and use its influence to build a cross-industry consensus, to assure a suitable Fall Back to Chip solution is developed as the migration to an ever more advanced next generation of payment applications and solutions gathers pace.

For more information on SPA, visit [www.smartpaymentassociation.com](http://www.smartpaymentassociation.com)