

Positional Data and Active Code (ACD) Used for the Cash Receipts and Settlement Scheme

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With the Internet firmly in place in our society today, the frequency of use of electronic commerce is increasing year after year, due to its convenience. This also means that the collection of payments from consumers, which are the settlements, has become even more important.

Due to its attributes, the settlement scheme for electronic commerce contains many issues that need to be resolved. As well as safety, speediness and reliability are especially in demand, since sales transactions are not conducted face to face but over networks. Further, the fees must be affordable when its pervasiveness, as an infrastructure that consumers participate in on a casual basis, is taken into consideration.

Although credit card companies deal with settlements in Europe and North America, here in Japan the national characteristic of preferring cash settlements complicates the situation somewhat, as there is a diverse range of settlement methods (Table 1), all of which cannot easily be supported.

Our attention was consequently drawn to the convenience store (hereinafter referred to as the "CV store"), as it has become one of the most involved entities in our lives today. On the other hand, we have also considered mobile telephones, which are now becoming a major media. We then collaborated with Digital Check,

Inc., a clearing agent for electronic commerce transactions, as well as CODE.X Inc., the developer of Active Code (hereinafter referred to as "ACD"^{*1}), to build a new cash receipt and settlement scheme, the "ACD Settlement Service". This scheme uses a positional information technology, which is a strength of Oki Electric.

In this paper, we shall first consider the prospects of the current status and issues of CV store settlements, which are considered as the mainstream for the future (relative to electronic commerce), from among numerous settlement methods available. We shall then continue with an introduction of the configuration and summary of the "ACD Settlement Service" and describe how this can be effective in mobile settlement scenarios, including CV store settlements. We will also mention its potential as new businesses.

Current Status and Issues of CV Store Settlements

The most popular response to the question, "what settlement method would you like to use?" (when purchasing products by mail order through the Internet), was a CV store settlement (Table 2).

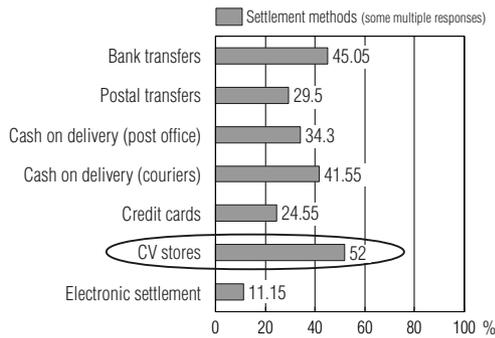
Table 1 Current status of settlement methods

		Features	Service fees (*)	
Postal transfer	Money transfer	Windows available throughout Japan.	JY70	
	Registered mail for cash	Relatively high fees but the safest.	JY360	
Bank transfer	Direct	ATMs	Money transfer made to store designated bank. Most popular method.	
		Telephone banking	Just a phone call does it.	
		Mobile banking	Money transfer made from mobile telephones, L-mode and PDA. Service available 24 hours a day.	
		Internet banking	Money transfer from a personal computer. Service available 24 hours a day.	
	Indirect	Credit cards	Only a few member stores. There are security concerns.	5% of the total amount
		Debit cards	Process is the same as cash, which is a sales feature. There are security concerns.	JY360
CV store settlements				
Settlement through courier		Sense of security for both users and stores.	Approx. JY300	
Consumer credit company		Used as a settlement method for installment payment users. Interest is incurred.	JY360	
Electronic money		Only a few environments available for use. Electronic wallet software must be installed in advance.	JY10/settlement transaction, 4.5% (for cash conversions)	

* An average figure for transferring amounts of less than JY10,000 to accounts at banks other than the transferee's originating bank.

*1) ACD is a registered trademark of CODE.X Inc.

Table. 2 Desirable settlement methods for mail order users



*Source: Documents of the Institute for Posts and Telecommunications Policy, Ministry of Public Management, Home Affairs, Posts and Telecommunications, July 2001.

Through lifestyle changes in recent years, our activities have been extended into the later hours of the night. Since CV stores in Japan are open for business 14 or more hours per day and 340 or more business days per year²⁾, as a general rule, CV store settlements are considerably more convenient.

Incidentally, although the proportion of intended uses of mobile telephones changed from the original service of voice communications to providing electronic mail and digital photography services, there is a tendency among the younger generations to envisage a culmination of all aspects of their lives with mobile telephones. It is for this reason they are called the “mobile generation”. They are also the major percentage of the population using CV stores. Therefore, if there was a settlement method that could use mobile telephones (web display) instead of payment slips and the venue was at CV stores, then this could be a nifty service that matches their lifestyle.

Table. 3 An example of a CV store settlement method

Method	Description	Advantages	Disadvantages
Payment slip	Make a payment at a CV store using the payment slip sent by the business.	Payments can be made at financial institutions as well as at a CV store.	Expenses for the issuing and posting of payment slips. Takes time to make a payment. Payment cannot be made without a payment slip, if forgotten.
Online payment slip	Print out the payment slip displayed on the screen at the time the merchandise is purchased on the web and then make the payment at a CV store.	Payment is possible at CV stores.	Payment cannot be made without a payment slip, if forgotten.
Information terminal for CV stores	A processing number is issued at the time the merchandise is purchased on the web and payment is made at the checkout counter of a CV store, which has a dedicated terminal installed. Lawson (Loppi) Family Mart (Fami Port)	Payment is possible at specified CV stores.	Payment cannot be made without a processing number, if forgotten.

On the other hand, when it comes to actually making a purchase, there are more than just a few among Internet mail order users, who prefer to make a cash settlement at a CV store because of concerns that credit information may leak over the net. Further, people who are under age cannot own a credit card in the first place. Demand for settlement at CV stores for electronic commerce transactions appears to be quite high for these people as well.

We shall now take a look at the flow of the CV store settlement process. CV store settlements can be categorized into three major methods (Table 3).

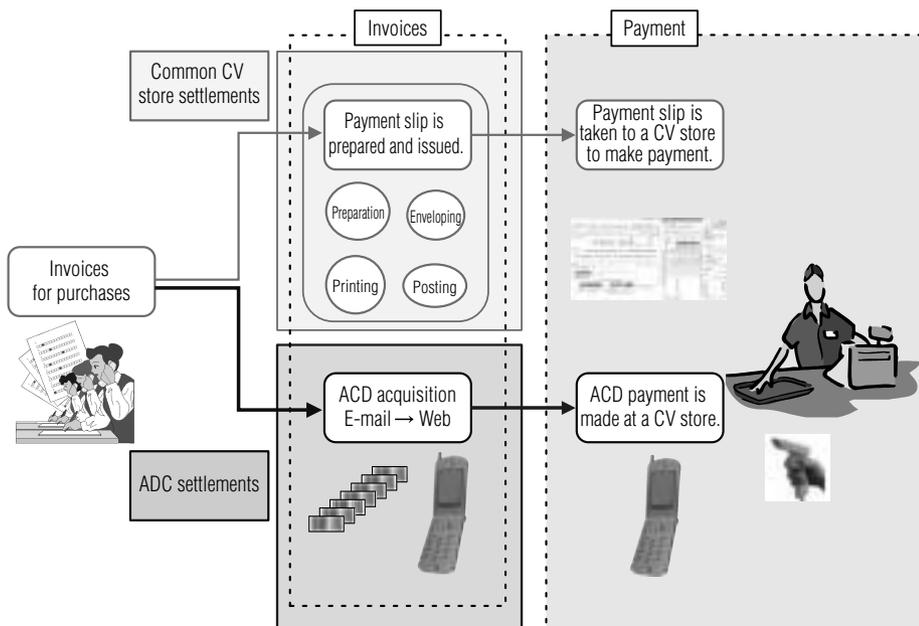


Fig. 1 Comparison of settlements with common CV store settlements

²⁾ Definition of the Manufacturer CVS Researcher.

Settlements are currently being made primarily with payment slips. As this process is realized through multiple steps, such as the preparation, printing, enveloping and posting of the payment slip, it not only requires time, between invoicing and payment, but also requires costs for posting. Recently, methods involving online payment slips and dedicated terminals at CV stores are also in use. These require that the user either physically brings a payment slip into a CV store or memorizes the processing number for payment, which results in a level of convenience that does not differ significantly from the method that uses payment slips.

Consequently we have the "ACD Settlement Service", a settlement method described in the following sections, involving the transfer of coded payment information to the mobile telephone of a user, who then takes it into a CV store to be scanned (Fig. 1).

What is ACD?

ACD (Active Code) is a technology developed by CODE.X Inc., (as mentioned earlier), used to consecutively display a bar code along a time axis on a screen .

The technology makes available abundant amounts of information in approximately 1,300 digits with a 0.1 second per code (JAN13) rate of information transmission, which is quite fast. Further, the information generated and encrypted by a server is deciphered with a JAVA program in a mobile telephone and dynamically reproduced on the mobile telephone. Copying and tampering, therefore, are effectively impossible without a decipher key.

The ACD is displayed on the screen of the mobile telephone that has the "ACD Settlement Service" and is read with a bar code reader to transfer the information to a POS register (Phot. 1).



Phot. 1 Reading information with a bar code reader

Since multiple bar codes can be processed at one time, all payment data, which used to be divided into three or four rows, can now be read and transferred all in one sweep. Further, it also has a feature that makes it possible to handle not only popular one-dimensional bar codes, such as JAN code and EAN code, but also two-dimensional bar codes as well.

It offers excellent versatility as existing bar code readers for POS cash registers can be used and thus no new facility investments are necessary.

Service Configurations

The configuration of the "ACD Settlement Service" is shown in Figure 2.

- (1) Users connect to the web function interfacing segment via the Internet.
- (2) Businesses and stores on the web are connected to the interface functioning segment for businesses or stores via the Internet or leased lines.
- (3) Management systems of clearing agencies are connected to the interface functioning segment for managing settlements.
- (4) The information of various charges is sent to charging servers from the interface functioning segment for charging servers.
- (5) The payment number is acquired from the information terminal at the CV store using the interface functioning segment for payment numbers.
- (6) Management of all settlement processes is performed by the functioning segment for managing settlements.
- (7) An accurate settlement time is managed and authenticated by the functioning segment for time authentication.
- (8) The positional information of each mobile telephone is acquired through the functioning segment for positioning.
- (9) The URL of the ACD settlement and payment number is transmitted by the functioning segment for mail transmissions.
- (10) Bar codes for the web or ACD are produced by the functioning segment for bar code preparations.
- (11) Display of the referred charge information and the charging for the transaction are performed by the charging server function (charging server is another server).
- (12) Completed settlement notifications, from the "ACD Settlement" in business or store sites, are received by the interfacing segment for completed settlement notifications.

Summary of Service

The "ACD Settlement Service" is a cash settlement delivery service that proposes to raise the validity of purchase contracts for purchases made with mobile telephones and personal computers by authenticating the contracting time and location whenever a purchase contract is made (Fig. 3).

When merchandise is purchased, the "ACD Settlement Service" operates in the sequence shown below (Fig. 4). Steps (1) to (6) represent the scope of the "ACD Settlement Service".

- (1) Merchandise is purchased at a web site.
- (2) The ACD settlement is selected as the mode of payment for the purchase.

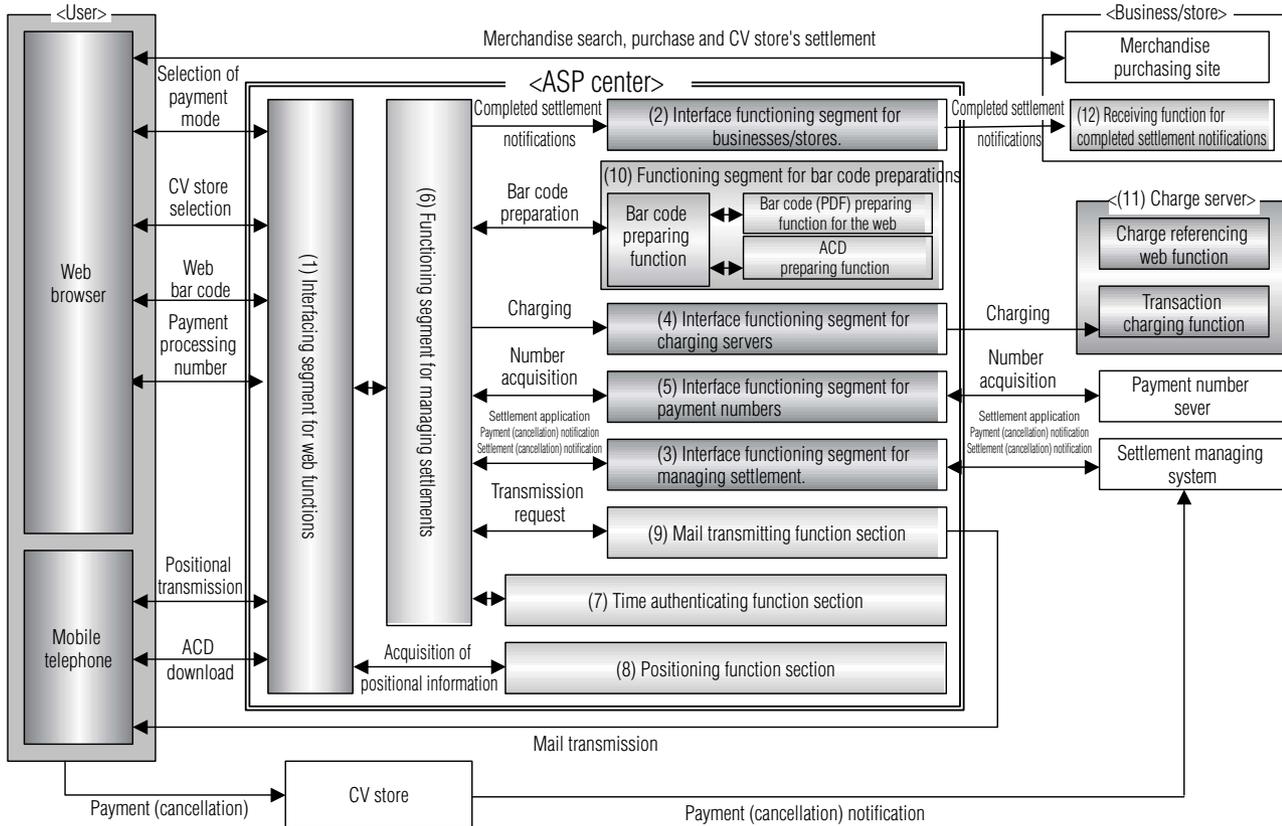


Fig. 2 Configuration of the ACD Settlement Service

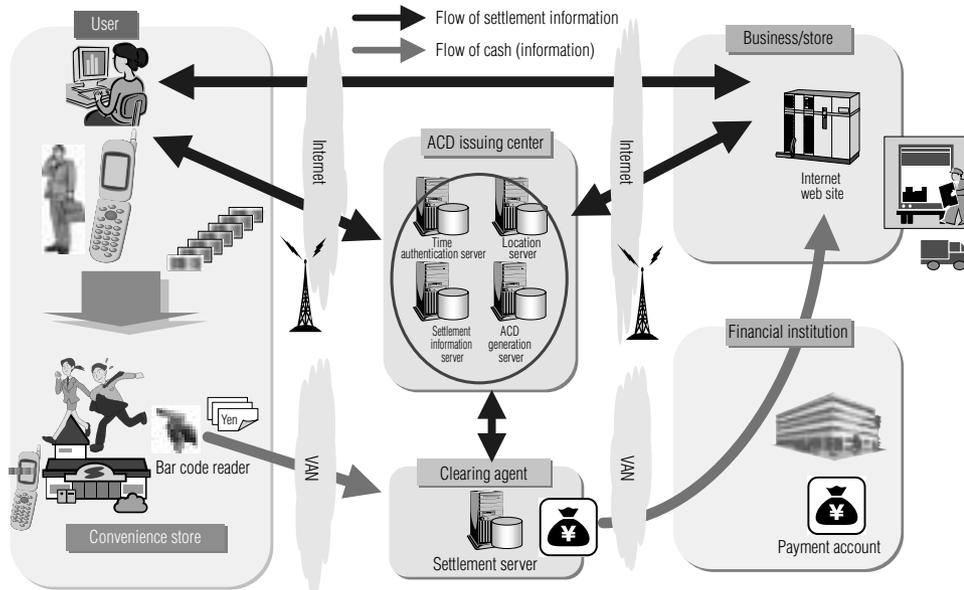


Fig. 3 Summary of a settlement

- (3) Verification of the purchase of merchandise is made through e-mail (information relating to merchandise names, prices, URL, etc.).
- (4) Access is made to the URL indicated in the verification e-mail. The purchase becomes official at this instant. Positional information is notified to

- authenticate purchase intentions.
- (5) ACD is issued (downloaded).
- (6) ACD is stored in the mobile telephone.
- (7) ACD is displayed at a CV store and payment for the merchandise is made at a POS cash register.

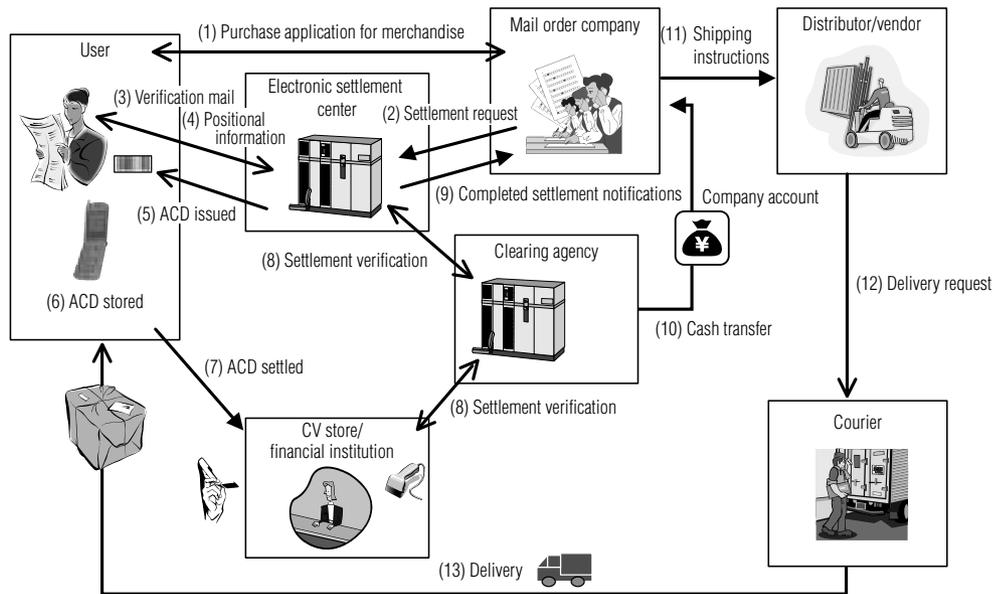


Fig. 4 Flow of events for purchasing merchandise

- (8) Payment information is notified to the clearing agent of the CV store. Settlement information is verified with the settlement center.
- (9) Once settlement has been verified, the completed settlement information will be sent to the business or store by the settlement center.
- (10) The clearing agent of the CV store transfers cash into a specified account of the business or store, thereby completing the clearing.
- (11) The business or store issues shipping instructions for the merchandise.
- (12) The delivery instructions are given to a courier.
- (13) The user receives the merchandise, which completes the transaction.

Just as with conventional settlements, a transaction is completed when a user actually makes a cash payment at a CV store by a set deadline. If the cash payment is not made by the deadline, the transaction will be considered cancelled and the contractual actions will become invalid (since advance payment is the standard mode of settlement for purchase contracts).

Further, a grace period is set up to accept cancellations by users, in order to accommodate a cooling off requirement during this period.

Authenticating Measures

Safety and reliability levels, exceeding those previously attained, are required by the contracts and agreements of the mobilization era. Although it is possible to authenticate the identity of persons with contracts on paper, through the use of signatures and personal seal impressions, another method is necessary for authenticating individuals with electronic contracts. Mobile telephones, in particular, are tools that provide a high degree of anonymity and fluidity, so there is a potential danger with respect to personal authentication.

Therefore, we propose the use of information regarding the time and location of the contract as a sure

means of authentication.

With the “ACD Settlement Service”, the “contracting time” is acquired through the time authentication function, while at the same time the “contracting location” is acquired from the positional information of the mobile telephone. We believe that the validity of contracts can be certified with this information.

Advantages for Implementing This Service

The first advantage that should be mentioned is an improvement in cash flow. The settlement process following a transaction can be speeded up by utilizing a CV store as the location for conducting settlements, as it generally stays open 24 hours a day in major metropolitan regions. Further, by using electronic payment slips or paperless payment media, not only can we reduce the time it takes from the invoicing to the payment, but costs involved in the invoicing process can also be reduced.

Furthermore, in the past users had to write the information onto payment slips themselves, however, with this service they can simply bring in their mobile telephones and have them read with bar code readers, thereby raising the level of convenience for users.

Finally, we must mention the possibilities of new features that can be brought about with this service.

In the ubiquitous society of the future, not only will safety and convenience become essential but differentiation from existing services will also be required.

In that perspective, the positional information is not limited to personal authentication, but it may potentially also provide value related to the locations themselves. For example, it will be possible to verify whether the contracting location is suitable for transactions, for instance checking to see whether any person who is under age has made any purchases in R rated locations. A particular location can create a new added value to services for attracting customers using positional

information, for example by issuing discounts for a particular locality.

Market Developments for the Future

As for market developments, we are currently introducing and presenting the “ACD Settlement Service” to businesses and stores, in order to have them consider offering this service as one of their settlement methods at the time merchandise is purchased. Specifically targeted entities vary greatly, from businesses in insurance, logistics, direct marketing, ticket and membership services, as well as other industries.

Further, we intend to prepare an infrastructure by making the system accommodate ATMs of various financial institutions, kiosk terminals and entrance gates (supporting electronic ticketing).

Conclusion

The “ACD Settlement Service” will not remain simply a highly convenient cash settlement service based on the authentication technologies of positional and time information, but it will become an epoch-making service with potential to create added value for locations.

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