

Electronic Payment Systems

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Traditional Methods

- Traditional payment methods include cash, checks, credit and debit cards.
- These methods have several shortcomings
 - Checks and cash cannot be exchanged in real time
 - Credit and debit card info exchanged over the phone or by email entails security risks
 - Credit/debit cards do not support individual-to-individual payment transactions
 - Some individuals do not have access to credit cards or checking accounts because of credit history
 - The overhead of all but cash do not support low value transactions (micropayments)

Comparison of Selected Instruments

	Cash	Credit Card	Travelers Checks	Prepaid Card
Easily Exchangeable	Yes	No	Yes	No
Acceptable to users	Yes	Yes	?	?
Small Transaction Cost	Low	High	High	?
Large Transaction Cost	Low	Low	Low	Low
Non-refutable	No	Yes	No	No
Transferable	Yes	No	No	No
Buyer Anonymous	Yes	No	No	Yes
Secure against unauthorized use	No	Some	Some	?
Retrievable	Yes	Yes	Yes	Yes
Tamper resistant	Yes	No	Yes	No
Monetary Value	Yes	No	Yes	Yes

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Cash

- Cash remains the dominant form of payment because of:
 - Lack of consumer trust in banking system
 - Inefficient clearing/settlement of non-cash transactions
 - Negative real interest rates on bank deposits

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- E-commerce requires payment methods that are:
 - Widely used by consumers and accepted by merchants and banks.
 - Real time, i.e. transactions are completed when consumer hits the pay button
 - Provide support for micropayments

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Required Properties of Electronic Cash

- Must have a monetary value
- Must be interoperable or exchangeable for other digital cash, paper cash, goods or services
- Must be storable and retrievable
- Must be tamper resistant while being exchanged

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Approaches to Electronic Tokens/Digital Cash

- Tokens or digital cash are forms of payment backed by a bank/financial institution and offer:
 - Transaction privacy and confidentiality
 - Support for micropayments, or small fee transactions
 - Real time exchange between buyer and seller

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Web Services

- Ecash
- Mondex
- Millicent
- Cybercash
- www.webcharge.com
- www.clickshare.com
- www.netchex.com

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www.digicash.com

- Ecash or electronic cash
 - Provided to consumers and merchants through financial institutions around the world
 - Uses digital signature technology based on public key cryptography for security
 - Buyer remains anonymous and does not need to provide personal information over the internet
 - Ecash usage cannot be tracked
 - Easily transferable: money can be transferred to a merchant, or friends/family by email
 - No charge to consumers

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Ecash is like currency

Bookmarks Location: <http://www.ecash.net/Consumers/> What's Related

Easy to Get Started
Fast
For any Type of Payment
At Cash Payment Desks
See How Easy eCash Is!

Benefits of eCash
Best Security Available
Convenient and Easy
Simple Returns
Small Payments
Contact Your Friends
Go Wireless!
Kids Shop & Bank Online
Shop Without Credit Cards

eCash is like traditional cash. The only difference is that eCash currency is electronic, rather than paper or metal. When you withdraw eCash currency (download it to your computer or other device), money is withdrawn from your eCash account. Once in your possession, eCash currency is as good as hard currency— you do not need any additional permission or authorization for use, and you have the freedom to spend your money at any time and to pay anyone. When you make a payment with eCash currency, the recipient deposits your payment or has the ability to spend it on the Internet.

eCash is the best way to pay over the Internet. And it's free to use!
While credit cards are accepted at more merchant sites on the Internet, eCash is the better way to shop:

- eCash is easier to use. You don't have to fill in personal information forms.
- eCash is safer and more private. You don't need to worry about someone stealing your personal information.
- eCash has no charges added for consumers, unlike some other online payment options.

Encourage your financial institution to contact us about eCash today! Financial institutions can visit <http://www.ecashtechologies.com/Banks/> for contact information.

eCash is the safest form of payment on the Internet.
The eCash security method has been unassessed for over 10 years. No market competitors come close to the unique eCash combination of speed, security, privacy, and ease of use. The eCash security

Document Done

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Simple user transaction

The screenshot shows a web browser window with the address bar containing a long URL. The page title is "Coffee Java Sold Here!". The main content includes two product listings:

- New Rich Italian Roast!**: "Try the new planet Italian Roast Coffee! Our most recent creation is a traditionally roasted Italian coffee, with a full body that will make even the pickiest coffee snob smile with delight! The coffee is a must-try at \$9.95." Below this is a "Buy Me Now!" button with the text "\$9.95 lb. Free delivery if you purchase one pound or more!"
- New planet Coffee Press**: "Our new French press makes a great gift!" Below this is a "Buy Me Now!" button with the text "Just \$19.95. Order now and receive a free coffee sampler set!"

The browser's status bar at the bottom shows "Document Done", "September 28, 2001", "Electronic Payments", and "11".

Underlying exchange causes confirmation request

The screenshot shows the same web browser window as above, but with a "Cash Payment request" dialog box overlaid. The dialog box contains the following information:

- Send payment to: planetCoffee.com
- Amount: \$9.95
- Description: Purchase from planet Coffee. Time: Tuesday, June 15, 2000 7:43:22 AM
- Agree to this payment? Yes No
- Submit Payment

To the right of the dialog box is a table with the following data:

Quantity	Price
1	\$9.95
	Free!
	\$9.95

The browser's status bar at the bottom shows "Document Done", "September 28, 2001", "Electronic Payments", and "12".

planet
Coffee

Java Sold Here!

Order Confirmation

Thank you.

Your order for 1 planet Italian Roast Coffee, \$9.95, is being processed by our shipping department. It will be shipped to the current address on file. Please allow 2 to 5 days for your order to arrive.

Note: You have just completed the eCash demo. We hope we were able to demonstrate how easy it is to use eCash. Please send us an e-mail message at cas@cas.com if you would like to sign up for our eCash news e-mail list. You can also let us know if you would like to be contacted as soon as a financial institution offers eCash products and services in your area. Please include your city, state, zip/postal code, and country in your e-mail message. And feel free to contact us with your questions or comments. Thank you!

This site is for demonstration purposes only. This is not an actual merchant Web site.

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www.mondex.com

- Provides a digital cash service
- Uses phones, smartcards, wallets, and pos devices
- Cards can be loaded over mondex phones
- Money can be transferred using wallets
- Money can be spent at POS terminals
- Certificates back transactions

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Mondex Smart Card

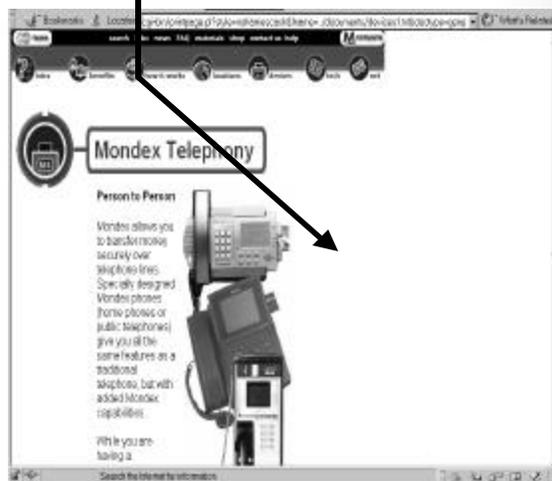
- Like a credit card
- Stores its value electronically in a microchip
- Holds up to five different currencies at one time
- Money can be transferred by telephone/internet to a retailer or merchant as well as other individuals
- Can be used for purchases of any size
- User remains anonymous -- no record of transaction
- Secure in difficulty of duplicating the microchip

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Mondex phones can be used to transfer cash



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A wallet is used to transfer amounts between two cards

Multiple functions allow different collections of different currencies to be checked or transferred

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The image shows a screenshot of a web browser displaying the Millicent wallet interface. A 'Devices' section is visible at the top left. Below it, a virtual wallet device is shown with a keypad. A text box next to the device reads: 'Now you have both cards in the wallet, click the transfer (↔) button on the keypad'. A callout box at the top states 'A wallet is used to transfer amounts between two cards', with an arrow pointing to the transfer button on the keypad. Another callout box on the right states 'Multiple functions allow different collections of different currencies to be checked or transferred', with an arrow pointing to the keypad area.

www.millicent.com

- Users can fund their account by:
 - Online credit or debit card
 - Directly billing ISP statement or telephone bill
 - Anonymous, prepaid cards
- Account can hold any currency
- Millicent will handle refunds, currency conversions, delivery problems, actual payments

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The image shows a slide with the Millicent website URL at the top. Below it is a list of features and funding options. The list includes: 'Users can fund their account by:' followed by three sub-points: 'Online credit or debit card', 'Directly billing ISP statement or telephone bill', and 'Anonymous, prepaid cards'. The next two main points are 'Account can hold any currency' and 'Millicent will handle refunds, currency conversions, delivery problems, actual payments'. The slide footer contains the date 'September 28, 2001', the text 'Electronic Payments', and the number '18'.

www.cybercash.com

- Cybercash offers services for businesses
- Cybercash also offers a wallet for users
- Everything is authenticated

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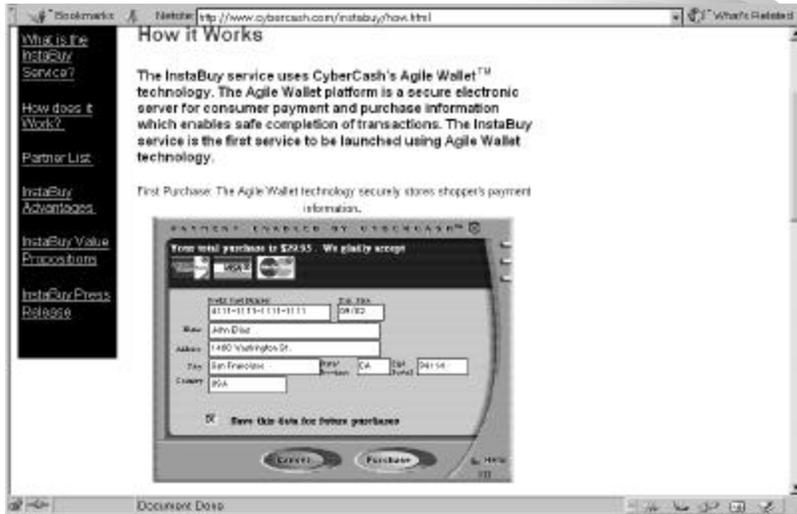
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Services to Vendors

- A variety of organizations provide services to vendors
- These include:
 - Credit card support
 - Digital cash support
 - Transaction management and reporting
- Suppliers include
 - Cybercash
 - Millicent

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www.cybercash.com

- CyberCash CashRegister
 - Supports major credit cards as well as debit and purchase cards
 - Flexibility to process offline orders
 - Automatically logs every transaction including sales, credits, and voids
 - Fast transaction processing speed for large volumes

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www.cybercash.com

- CyberCash CashRegister (cont)
 - All transactions are encrypted and digitally signed
 - Customers are notified in “real time” of rejection/approval of transactions

www.millicent.com

- Must have a website to participate
- Vendor can be apart of the Millicent network or
- Can integrate Millicent software directly into their own website to eliminate fees
- Offers pay-per-click, earn-per-click, and subscriptions

Banking Services

- Banking Services
 - Offers 24 hour, seven day a week online banking
 - Uses encryption customers security
 - Password protection
 - No transaction fees
- Major online banks include:
 - www.compubank.com
 - www.sfnb.com
 - www.citibank.com/us/