INNOVATIONS IN PAYMENT SYSTEMS

UNIFIED PAYMENTS INTERFACE (UPI)

- A Paradigm Shift in Ubiquitousness!

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Executive Director
RESERVE BANK OF INDIA

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<table>
<thead>
<tr>
<th>Payment destination</th>
<th>Person (P/C)</th>
<th>Merchant / Business (M/B)</th>
<th>Government (G)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Person (P/C)</strong></td>
<td>Remittances - Domestic—migrant labor remittances - International</td>
<td>Digital payment instrument for - Online merchant payments - E-comm, Utility bills, etc.</td>
<td>- Road toll - Tax - Payments for applications - Payments to semi government organizations such as educational institutions</td>
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<td></td>
<td>Seamless P2P transfers - Friends, family, etc.</td>
<td>- Proximity payments - In-store payments - Cash on delivery</td>
<td>- Taxes - Excise duty payments - Toll payments</td>
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<td>Digital micro payments - Payments for services</td>
<td>- Travel and transport</td>
<td>- Central government to state government transfers - Budget allocation payments to government agencies</td>
</tr>
<tr>
<td><strong>Merchant/Bus (M/B)</strong></td>
<td>Salary payments for daily contract workers</td>
<td>Digital supply chain payments (Small business to business) - Retailer to distributor - Dealer payments etc.</td>
<td>- DBT (Subsidy transfers) - Welfare scheme money transfers e.g. NREGA - Government employee salary</td>
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<td></td>
<td>Reimbursements</td>
<td>- Vendor payments</td>
<td>- Subsidies - Tax repayments</td>
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<td>Refund payments</td>
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<td>Dividends</td>
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<td><strong>Govt. (G)</strong></td>
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What is Unified Payment Interface?

Objective of a unified payments system is to offer an architecture and a set of APIs on top of existing systems to facilitate online instant payments and financial inclusion.

**Push & Pull Payments**
- The payments can be both sender (payer) and receiver (payee) initiated and are carried out in a secure, convenient, and integrated fashion.

**Easy Instant Payments**
- The unified payment system is expected to further propel easy instant payments via mobile, web, and other applications.

**Scalable Architecture**
- This next generation payment system provides an ecosystem driven scalable architecture and a set of APIs taking full advantage of mass adoption of smartphone.

**1 Click 2FA & Virtual address**
- Virtual payment addresses, single click 2 factor authentication, Aadhaar integration, use of payer’s smartphone for secure credential capture, etc. are some of the core features.
## Basic Structure of UPI

### NPCI Services covered currently
- IMPS – Phase I

### Security
- HTTPS, PKI Infrastructure, (MPIN on mobile and OTP is encrypted using the Public Key and decrypted by the Issuer using the Private Key), Device fingerprinting

### Addresses allowed
- Aadhaar Number, Mobile Number, and Account Number & Virtual Address

### Virtual address
- **Global Addresses**: Resolved by NPCI, Aadhaar Number & Mobile Number @ NPCI handle
- **Virtual Address**: Resolved by PSPs, using Address Translation API, @ psp handle

All address will be normalised as Handle - “account@provider” format
Participants

**PAYMENT SERVICE PROVIDER (PSP)**

- PSPs will be banks who will provide Apps

**BANKS**

- Merchant or customer’s bank (account relationship)

**NPCI**

- NPCI provides UPI interface.
Benefits to Banks

Simple
(Single click 2FA)

Universal App for transactions

Leverages existing Infrastructure

Secure

Payments based on Single/Unique Identifier

Tap C2B segment & E-Com / M-Com
Benefits to Merchants

- Seamless fund collection from customers - single identifiers
- No risk of storing customer’s virtual address like in Cards
- Tap customers not having credit/debit cards
- Suitable for e-Com & m-Com/
  Resolves the COD collection problem
- Single click 2FA facility to the customer - seamless Pull
- In-App Payments (IAP)
Benefits to End Users

**Privacy**
Share only Virtual Address and no other sensitive information

**Multiple Utility**
Cash on delivery/bill split sharing/merchant payments/remittances

**One Click 2 FA**
Authorise transaction by entering only the PIN (Biometric to Follow)

**Work across various interfaces**
Payment request generated on Web interface; authorized on Mobile interface (App)

**Payment through Aadhaar Number**
Pay using the Aadhaar number

**Availability & Security**
Available 24*7*365. Customer does the transaction on his personal device
Transaction Types

Financial Transactions
- Pay Request
- Collect Request

Non-Financial Transactions
- Mobile Banking Registration*
- Generate One Time Password (OTP)
- Set / Change PIN
- Check Transaction Status
- Log a complaint

* For mobile numbers already registered with the bank for SMS alerts
Modes of Payments

Application
- Stand alone Application (Including existing bank App)
- Augmented Service (UBER-PayTm)
- Complex Augmented Service (Zomato-Uber-PayTm)

Web
- E-Commerce
  - Online Payment (Collect initiated on Web using VPA)
  - UPI on Delivery (Proximity Push/Pull)

In-Store
- Retail Chains
- Service Stops (Restaurants, Saloon, workshops)
- Mom & Pop Stores
  *Pre-Authorized Low Value Transactions
# Benefits of UPI

## Simplified Authentication:

<table>
<thead>
<tr>
<th>Authentication</th>
<th>First Txn</th>
<th>Authorised by</th>
<th>Subsequent Txn</th>
<th>Authorised by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Factor</td>
<td>Mobile Number (OTP)</td>
<td>Issuer</td>
<td>Mobile Number/User ID</td>
<td>PSP</td>
</tr>
<tr>
<td>2nd Factor</td>
<td>MPIN* or Biometrics matched against UIDAI</td>
<td>Issuer</td>
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**Simplified Issuance Infrastructure:** One can specify the beneficiary details in the form of A/C Number, Mobile Number, Aadhaar Number & also Virtual address depending on the privacy concerns of the customer. Mobile phone is used for authorization.

**Simplified Acquiring Infrastructure:** India has nearly a billion phones and 150 million smartphones (expected to be at 500 million in next 4-5 years), massive scale can be achieved if effective use of mobile is made compared to creating costly physical acquiring infrastructure.

**Innovation:** Innovations such as reminders, using multiple accounts via single mobile applications, using special purpose virtual addresses, etc. allow users to enjoy superior UX.

**1-click 2-FA Transactions:** Since mobile number is bound to the device, the mobile phone itself becomes the first factor of authentication and M-Pin/Biometric is used for second factor authentication.

**Creating National Interoperability:** Proactively creating this unified interoperable interface allows all players to innovate and provide superior customer experience and still provide a secure, standard based, interoperable payment scheme.
UPI-on-Delivery (Go cashless with COD)

Package received at Home → Scanning of QR will result in invoking of available UPI PSP apps on customer device → Customer verifies the transaction and authenticates → Delivery boy receives the confirmation of the payment.
Offline Payment Modes – Service Stops

1. Starbucks In-App Menu
2. Pay by UPI
3. Payment by Scanning QR Code
4. Confirm Payment

MERCHANT’S DEVICE
CUSTOMER’S HANDSET
Confirmation on Merchant’s Device
Thank You!

UPI has been well received and is growing...