India's digital payment journey - The role of Central Bank
UPI Story of India

18th May, 2022

National Payments Corporation of India – Transforming Payments

NPCI has transformed and modernized the payment infrastructure in India by driving innovations in payments

An Umbrella Organization for all retail payments in India. Incorporated in the year 2008	NPCI was set up under the guidance and support of Reserve Bank of India and Indian Banking Association	**NPCI is a not-for-profit company**

Presently 66 Partners are shareholders of NPCI

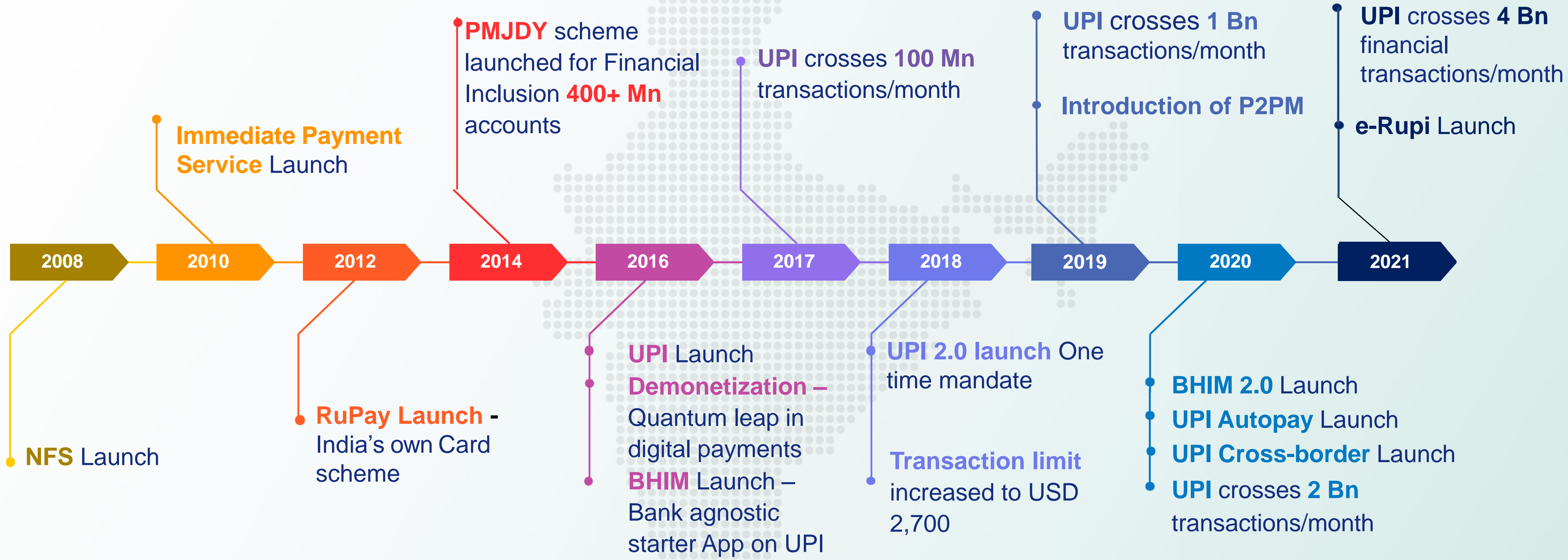| **19** Private Sector Banks	**04** Foreign Banks	**10** Multi State Co-op Banks	**07** Regional Rural Banks	**11** Public sector Banks	**02** Payments Banks	**10** Payment System Operators (Non Banks)	**04** Small Finance Banks

Regulatory Bodies

Shareholding Entities

NPCI's UPI platform empowering India's Digital Economy

Single Rail → **Innovation let Product Growth** → **UPI led Platform Approach**

Timeline:

- **2008** — NFS Launch
- **2010** — Immediate Payment Service Launch
- **2012** — RuPay Launch - India's own Card scheme
- **2014** — PMJDY scheme launched for Financial Inclusion **400+ Mn** accounts
- **2016** — UPI Launch Demonetization – Quantum leap in digital payments; BHIM Launch – Bank agnostic starter App on UPI
- **2017** — UPI crosses **100 Mn** transactions/month
- **2018** — UPI 2.0 launch One time mandate; Transaction limit increased to USD 2,700
- **2019** — UPI crosses **1 Bn** transactions/month; Introduction of P2PM
- **2020** — BHIM 2.0 Launch; UPI Autopay Launch; UPI Cross-border Launch; UPI crosses **2 Bn** transactions/month
- **2021** — UPI crosses **4 Bn** financial transactions/month; e-Rupi Launch

Diversified Product suite: RuPay | BHIM (BHARAT INTERFACE FOR MONEY) | UPI (UNIFIED PAYMENTS INTERFACE) | IMPS (IMMEDIATE PAYMENT SERVICE) | AePS (AADHAAR ENABLED PAYMENT SYSTEM) | BHARAT BILLPAY | *99# | NACH (NATIONAL AUTOMATED CLEARING HOUSE) | CTS (CHEQUE TRUNCATION SYSTEM) | NETC (NATIONAL ELECTRONIC TOLL COLLECTION)

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Unified Payment Interface

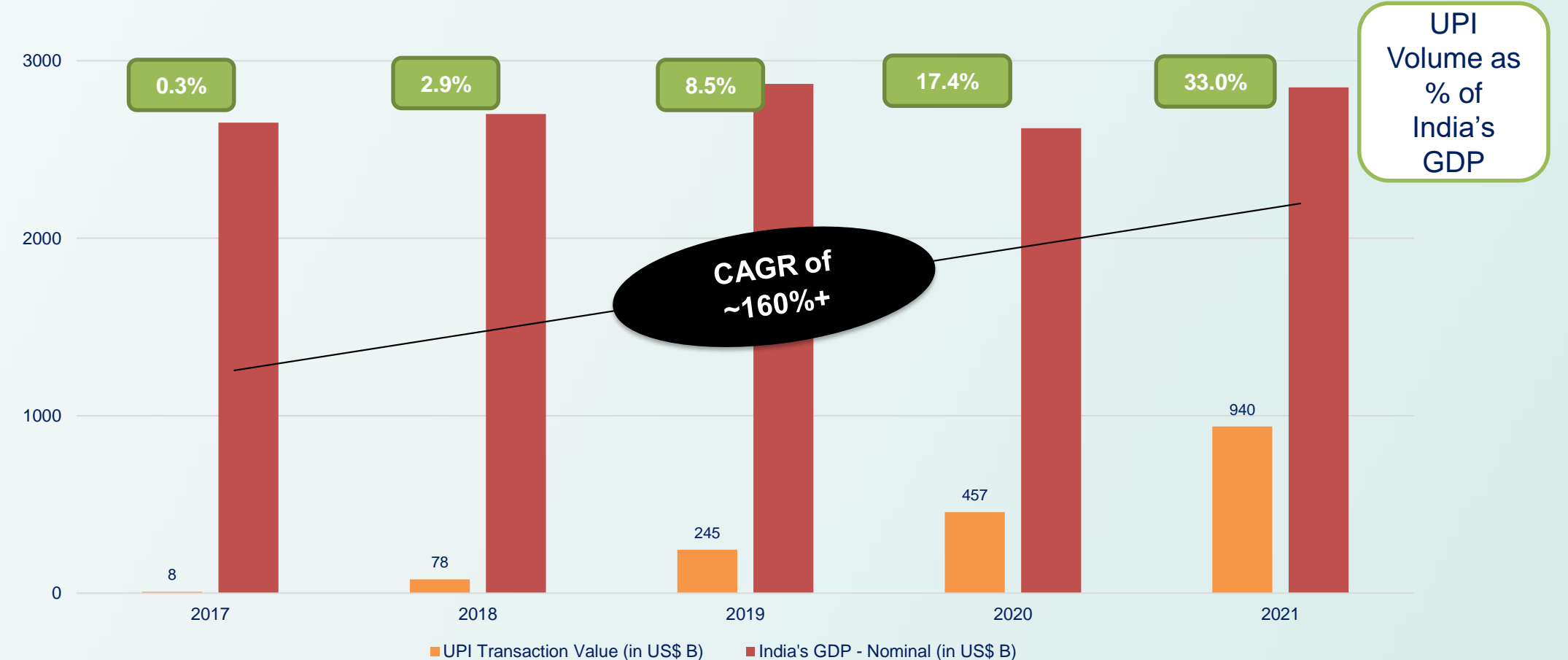*Real-time Payments Platform for the world*

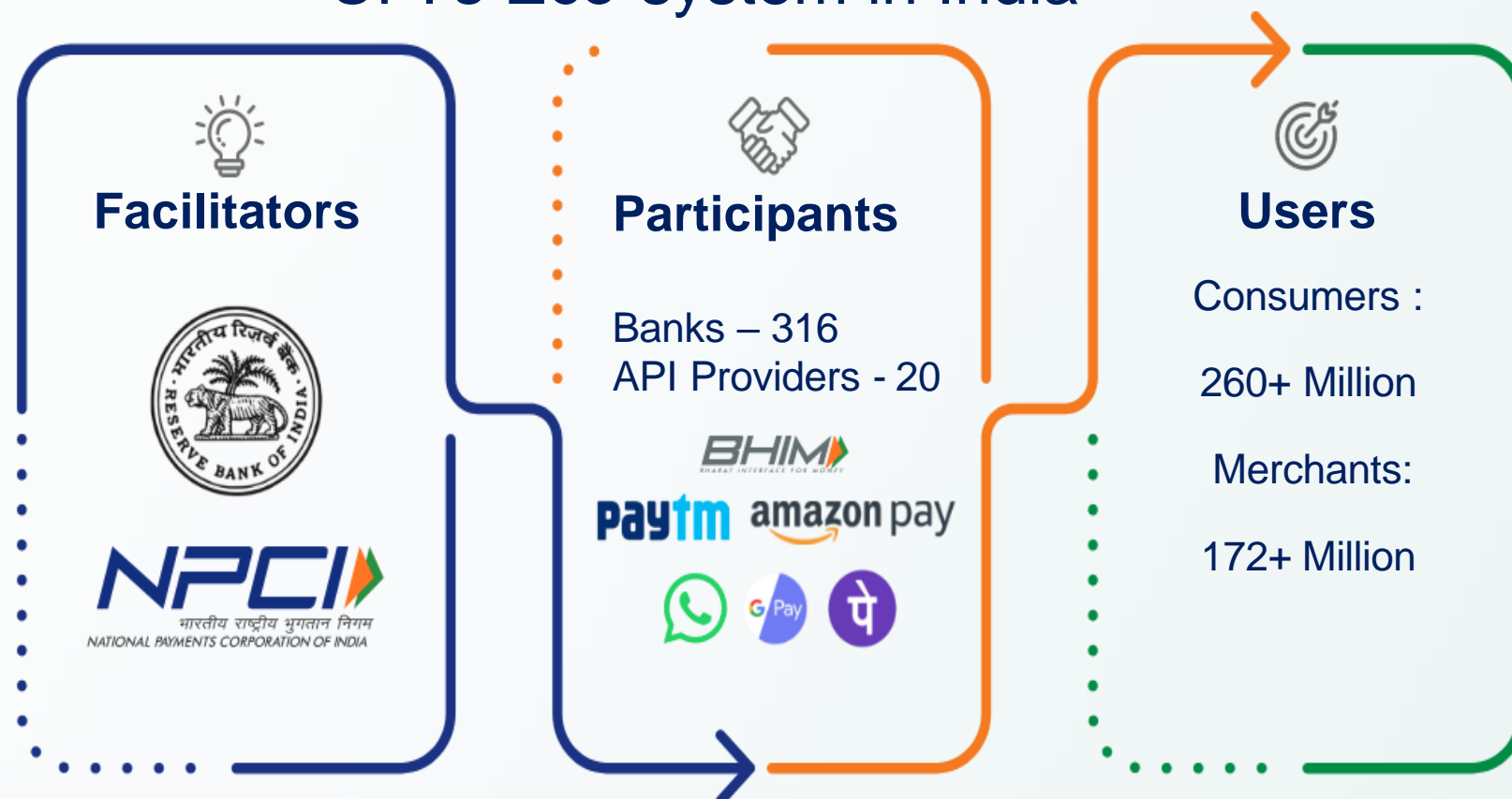# With 39 Billion transactions in 2021, India is global leader on digital payments

UPI processed **5.58 Billion** financial transactions and **USD 129 Billion+** transaction value in April 2022, originating from a base of **260 Million+** consumers

#1

- On **processed value** in the World
- On **processed transactions** in the World
- Operating with **100% Interoperability**
- Enabling **Open Banking** for Indians
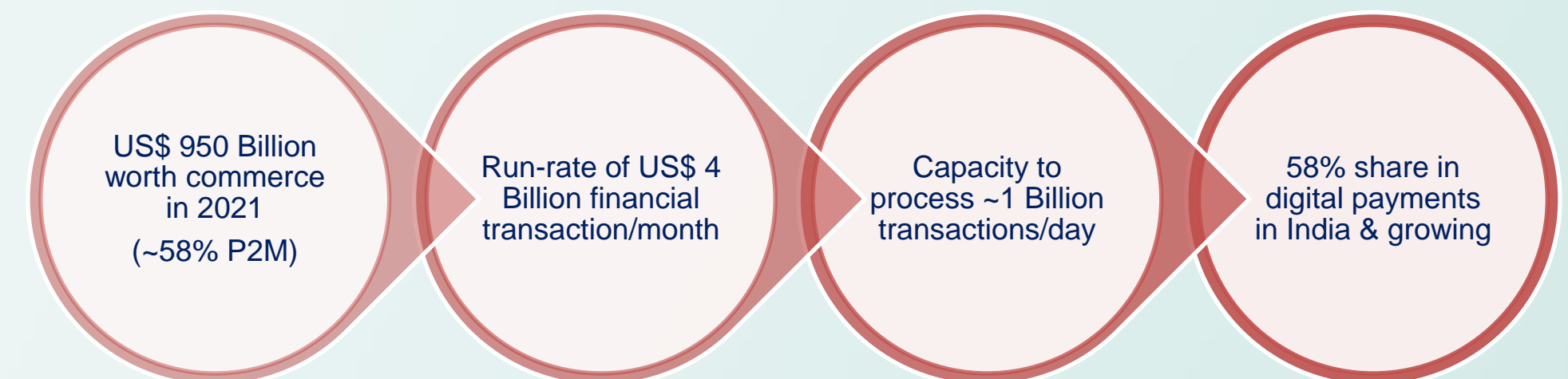- **Democratizing** payments - multilingual capabilities, supporting feature and smart phone equally
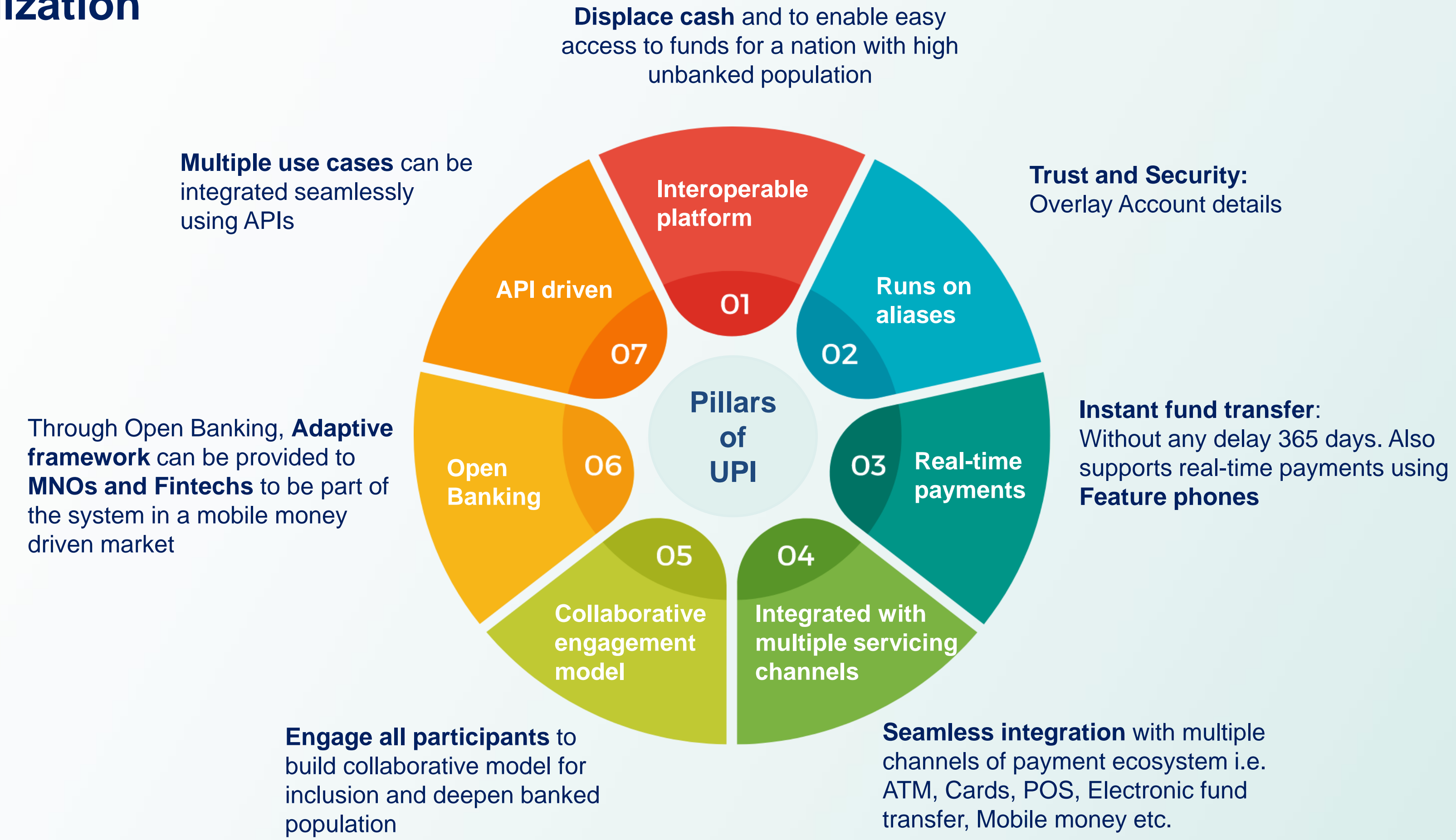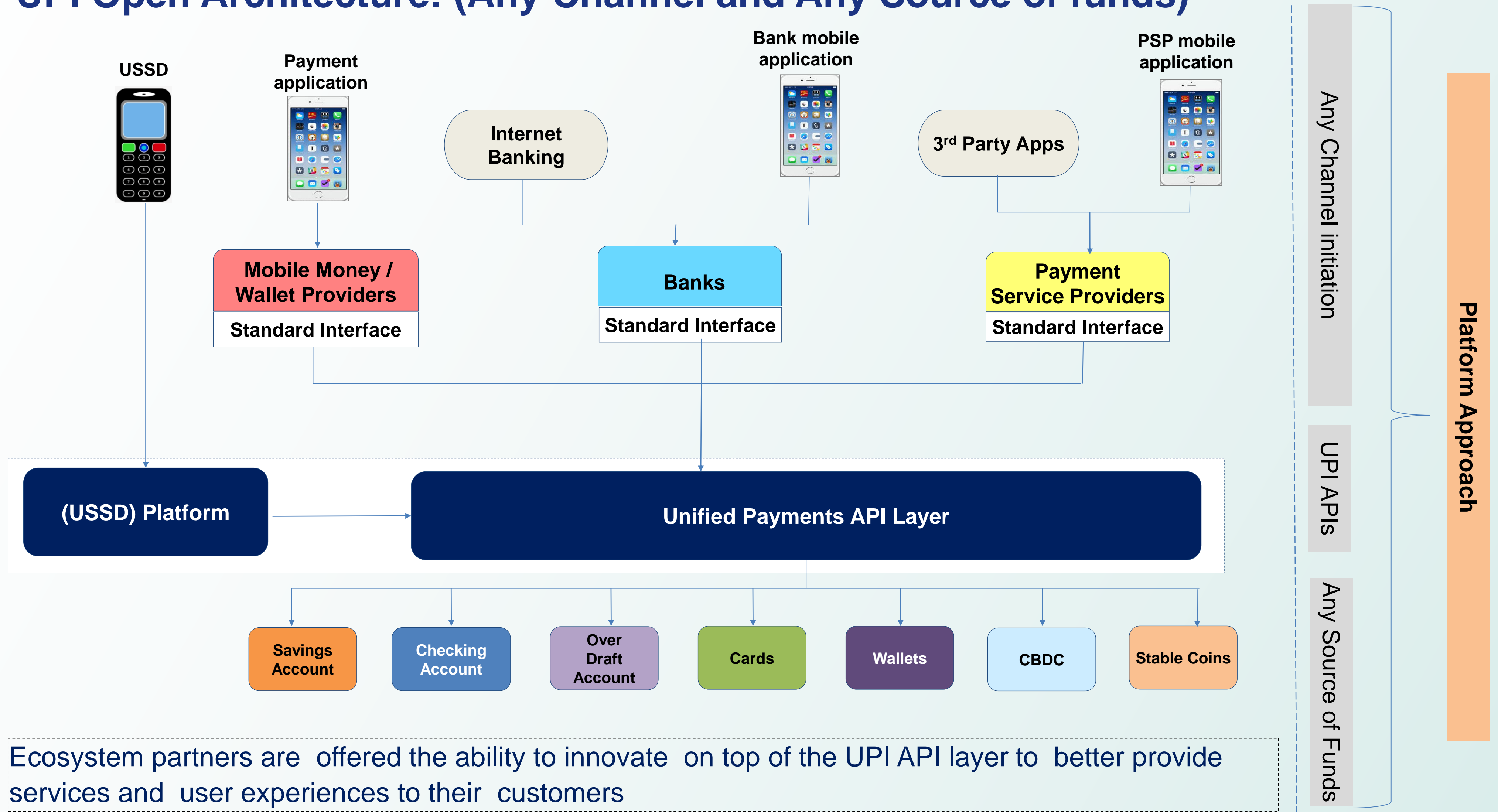
UPI's Performance in India

UPI Volume as % of India's GDP

Year	Percentage	UPI Transaction Value (in US$ B)	India's GDP - Nominal (in US$ B)
2017	0.3%	8	
2018	2.9%	78	
2019	8.5%	245	
2020	17.4%	457	
2021	33.0%	940	

CAGR of ~160%+

■ UPI Transaction Value (in US$ B)   ■ India's GDP - Nominal (in US$ B)

UPI's Eco-system in India

Facilitators

RESERVE BANK OF INDIA

NPCI
भारतीय राष्ट्रीय भुगतान निगम
NATIONAL PAYMENTS CORPORATION OF INDIA

Participants

Banks – 316
API Providers - 20

BHIM
Paytm   amazon pay
WhatsApp   G Pay   PhonePe

Users

Consumers :

260+ Million

Merchants:

172+ Million

UPI's contribution to Digital Payments in India

- US$ 950 Billion worth commerce in 2021 (~58% P2M)
- Run-rate of US$ 4 Billion financial transaction/month
- Capacity to process ~1 Billion transactions/day
- 58% share in digital payments in India & growing

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UPI UNIFIED PAYMENTS INTERFACE

e-RUPI PREPAID e-VOUCHER

✕99#

BHIM BHARAT INTERFACE FOR MONEY

UPI through its 7 pillars can deliver value in areas of inclusion, interoperability and standardization

Displace cash and to enable easy access to funds for a nation with high unbanked population

Multiple use cases can be integrated seamlessly using APIs

Trust and Security: Overlay Account details

Through Open Banking, **Adaptive framework** can be provided to **MNOs and Fintechs** to be part of the system in a mobile money driven market

Instant fund transfer: Without any delay 365 days. Also supports real-time payments using **Feature phones**

Engage all participants to build collaborative model for inclusion and deepen banked population

Seamless integration with multiple channels of payment ecosystem i.e. ATM, Cards, POS, Electronic fund transfer, Mobile money etc.

Pillars of UPI

- O1 — Interoperable platform
- O2 — Runs on aliases
- O3 — Real-time payments
- O4 — Integrated with multiple servicing channels
- O5 — Collaborative engagement model
- O6 — Open Banking
- O7 — API driven

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UPI Open Architecture: (Any Channel and Any Source of funds)

USSD

Payment application

Bank mobile application

PSP mobile application

| Internet Banking | | 3rd Party Apps |

Mobile Money / Wallet Providers
Standard Interface

Banks
Standard Interface

Payment Service Providers
Standard Interface

(USSD) Platform

Unified Payments API Layer

| Savings Account | Checking Account | Over Draft Account | Cards | Wallets | CBDC | Stable Coins |

Any Channel initiation

UPI APIs

Any Source of Funds

Platform Approach

Ecosystem partners are offered the ability to innovate on top of the UPI API layer to better provide services and user experiences to their customers

UPI complies with International risk management standards

UPI Risk management

Compliance

- Committee on Payment and market Infrastructure (CPMI) Fast Payment Principles

- Principles for Financial Market Instruments (PFMI)

Settlement

- Multiple daily settlements
- Settlement Guarantee Fund

Fraud Management

- Real time AI based fraud risk monitoring system
- Real time liquidity manager
- Fraud risk management solution
- 2 Factor Authentication
- Consumer protection

✔ All payments processed are final and irrevocable

✔ Settlement: Eight times a day, reducing net settlement risk; can be scaled further

✔ Settlement Guarantee Fund to address liquidity and credit risk

✔ Artificial-intelligence based monitoring system and real-time liquidity manager

✔ Fraud risk management solution backed by advance algorithm with multiple variables

✔ Two-factor authentication, to ensure the safety and security for consumers and banks

Modular Architecture for flexibility in deployment

Decoupled API based Architecture: UPI comprises a back-end and front-end solution which can be individually applied

UPI
UNIFIED PAYMENTS INTERFACE

⭐ FRONT END
APPLICATION LAYER

⚙ BACK OFFICE
(URCS):

BHIM
BHARAT INTERFACE FOR MONEY
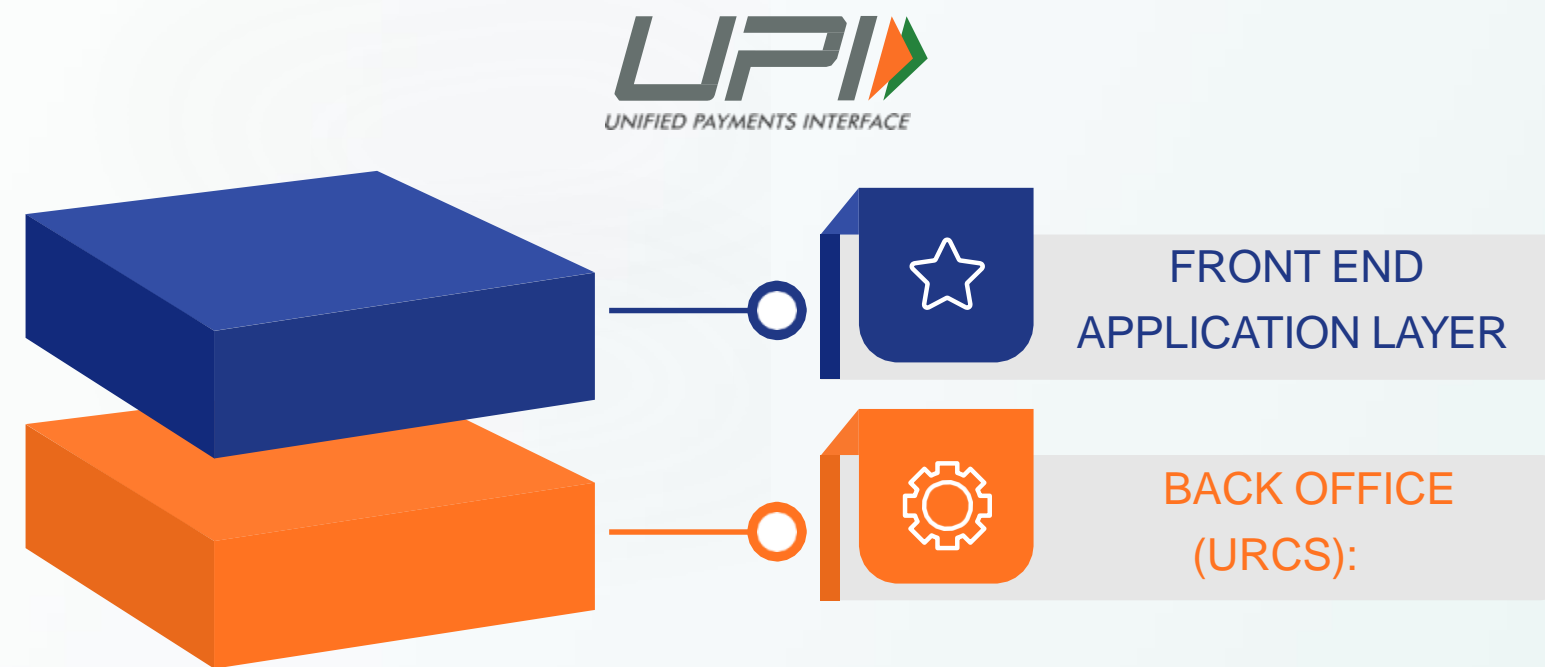
Functionality and Features

✅ UPI is a comprehensive and full fledged RTP solution

✅ Front-end could be integrated on top of alternative existing backend

✅ Backend can be used as the base rail on which different front ends could be run

✅ The clearing and settlement takes places through back office system that helps in real time netting of transactions

Functionality and Features

✅ A Bank agnostic app owned by NPCI that allows customers to make simple, easy and quick payment transactions using Unified Payments Interface

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India's Digital Transformation Journey
Aided by the 'Regulator' and driven by 'Ecosystem'

Trends and Factors influenced digitisation: INDIA STACK

Universal suite of Open API program

PRESENCE-LESS LAYER	Aadhaar – Unique National Id for every Indian	Unique digital biometric identity with open access to nearly all Indians users
PAPERLESS LAYER	Aadhaar eKYC, eSign, and Digital Locker	Rapidly growing base of paperless systems with billions of artifacts
CASHLESS LAYER	IMPS, AEPS, APB, NETC and UPI	Game changing electronic payment systems and transition to cashless economy
CONSENT LAYER	Account Aggregator Framework	Open Personal Data Store

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Regulation on Customer Authentication in India

The principal objectives of two-factor authentication are to protect the confidentiality of customer account data and transaction details.
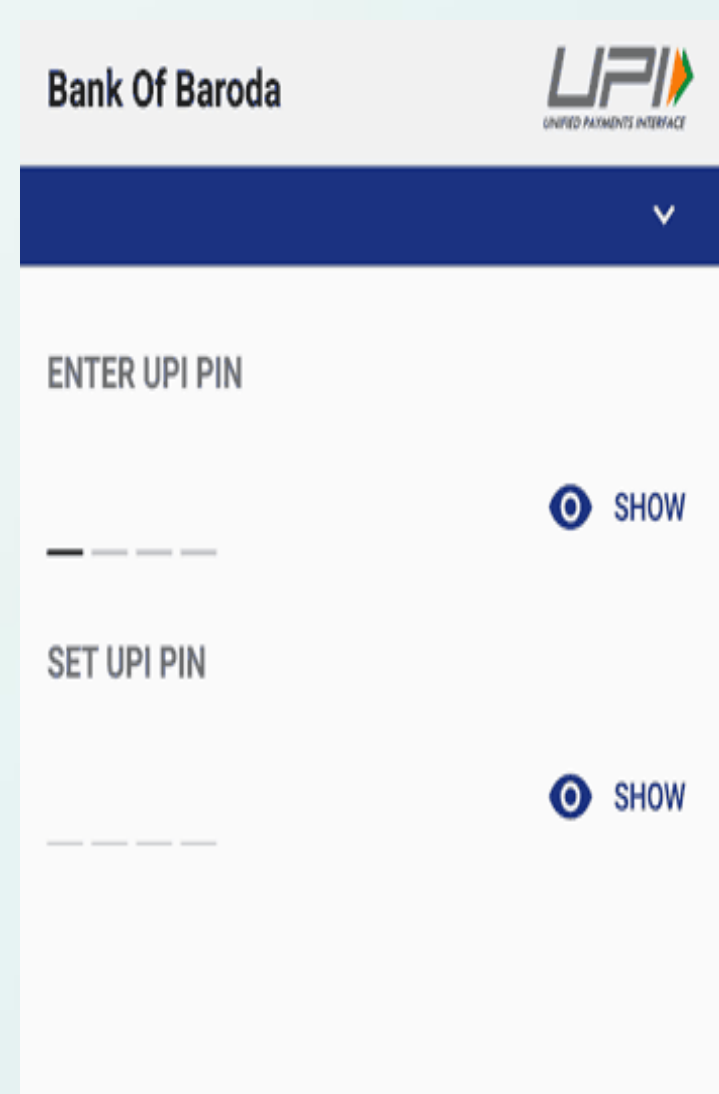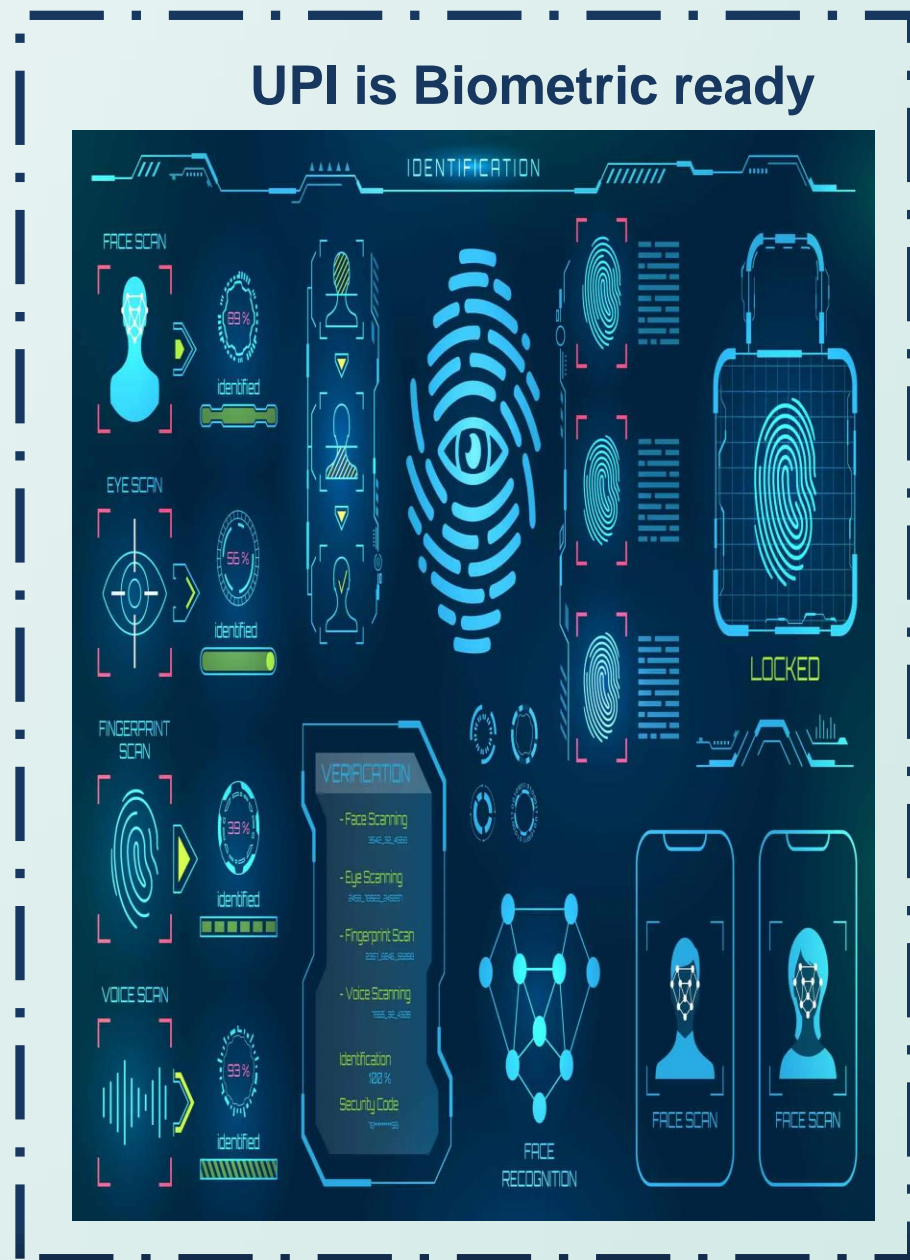
Prevalent factors of Authentication

What you have?
- Cards
- Mobile

What you Know
- OTP
- PAN
- CVV

What you are
- Biometrics
  - IRIS
  - Fingerprint
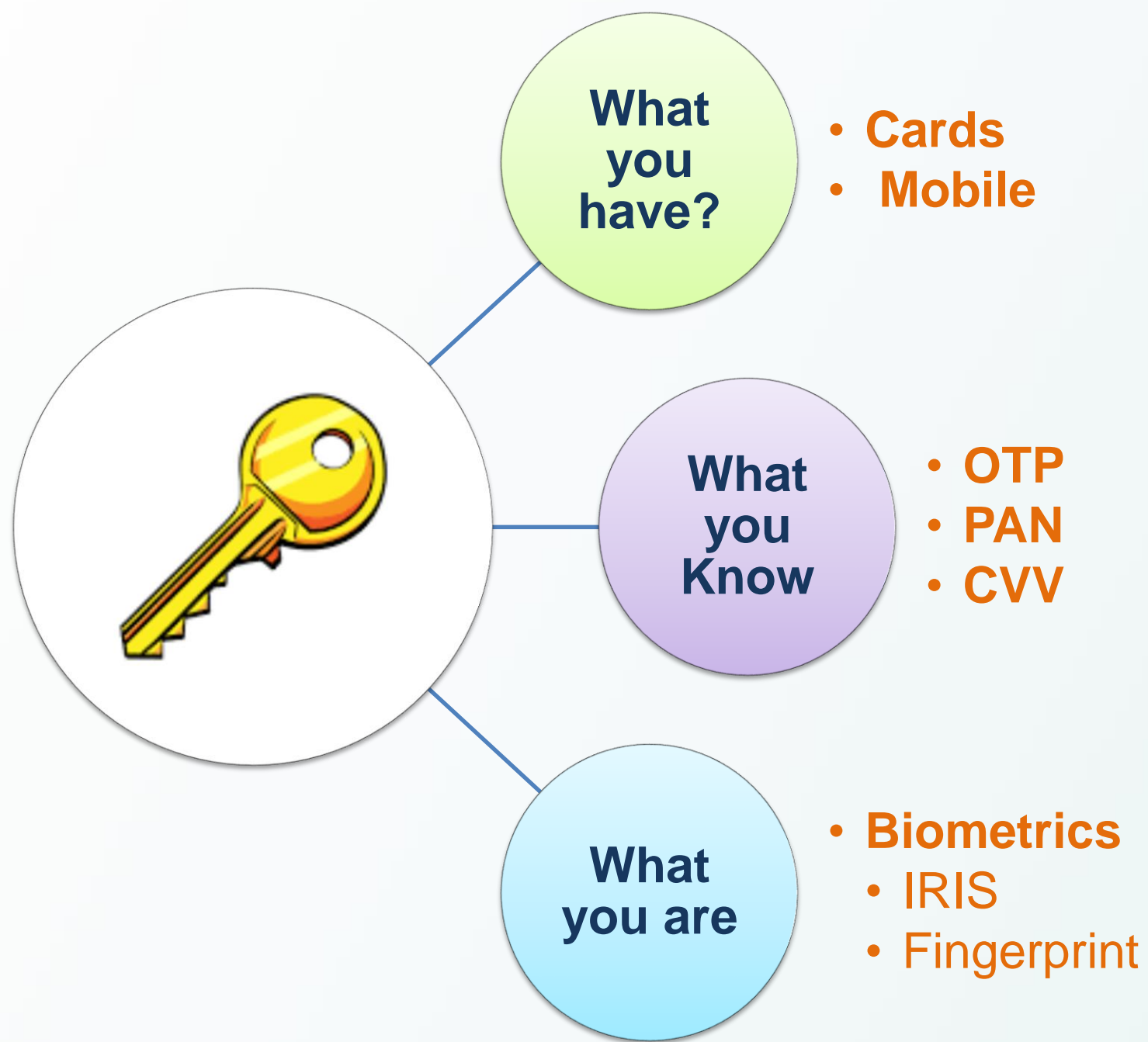
2 Factors deployed in UPI

Bank Of Baroda — UPI

ENTER UPI PIN — SHOW

SET UPI PIN — SHOW

UPI is Biometric ready
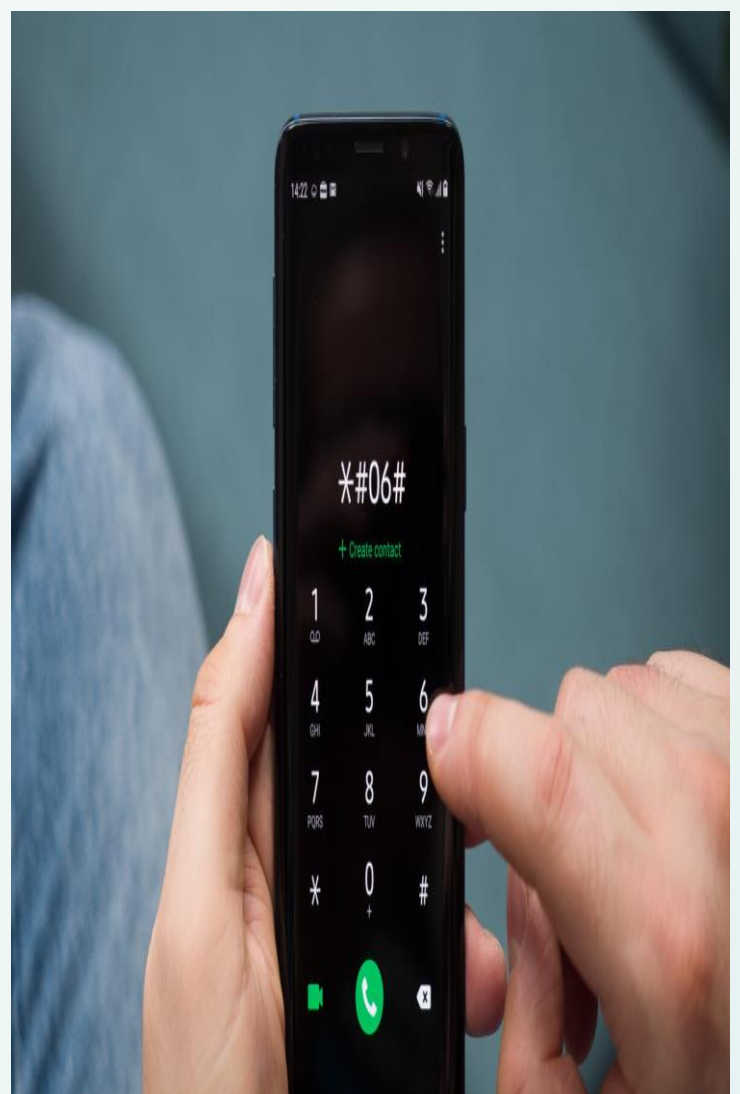
What we have?
Mobile phone

What we know?
PIN/Password

Who we are?
Biometrics

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Regulators role in enabling digital payments

#99 For Feature phones

Innovation Hub & Regulatory sandbox

Security Control Directions

Online Dispute Resolution (ODR)

Digital Payment Index

Encourage Healthy Competition

Affordable Cost

Interoperable QR Codes

Annual Agenda by Department of Payment and Settlement System, RBI

Continued emphasis on **safety, security, efficiency, innovation, competition, customer protection and financial inclusion**.

Enabling framework for increased participation of non-banks in **centralized payment systems**
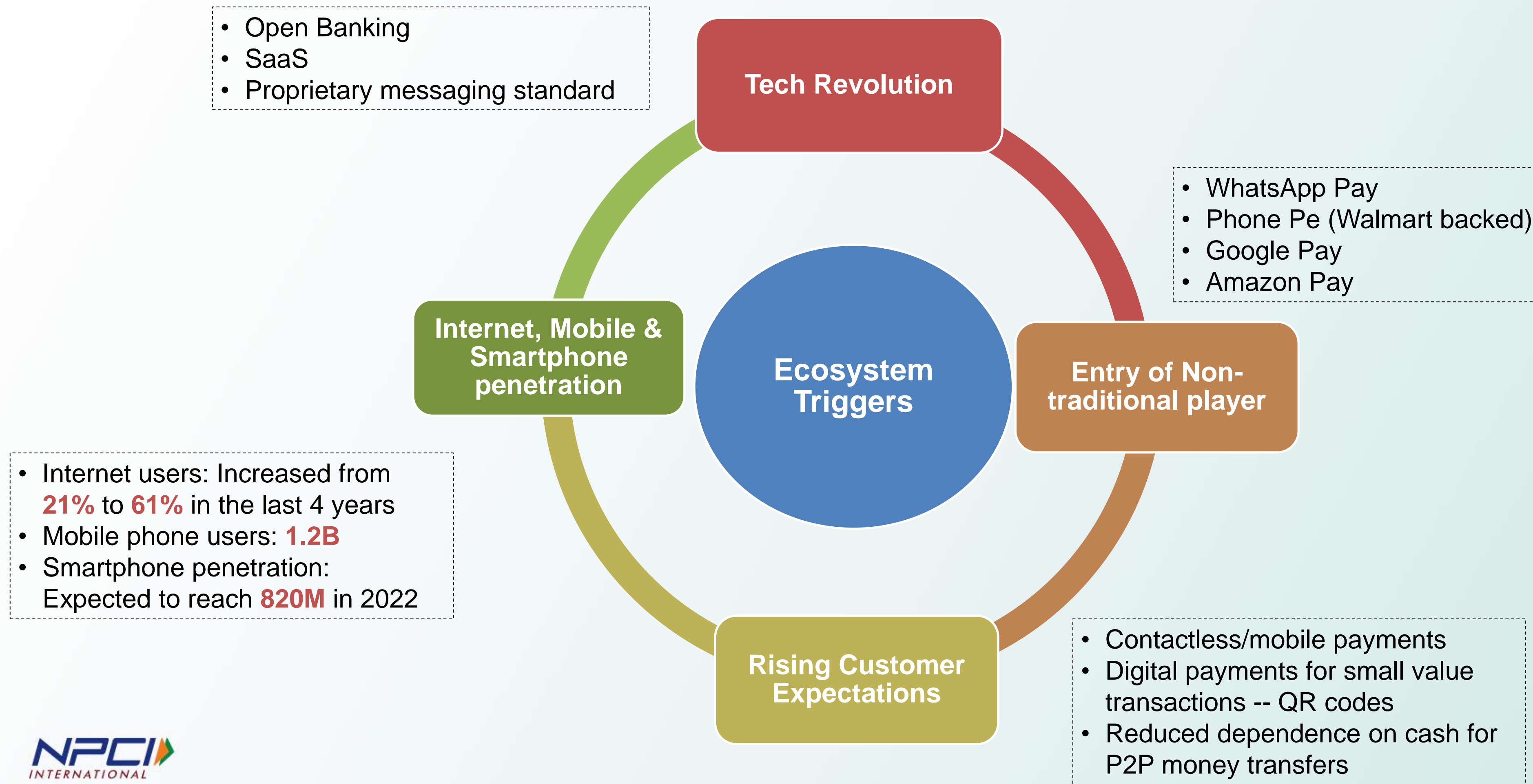
Consistent focus on consumer awareness campaigns on digital payments, which are the building blocks to achieve the objective of a **"less-cash"** society.

Constitution of a High-Level Committee on Deepening of Digital Payments & **Creation of PIDF**

Framework for facilitating Small Value Digital Payments in Offline mode

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Trends and Factors influencing digitisation in India

- Open Banking
- SaaS
- Proprietary messaging standard

Tech Revolution

- WhatsApp Pay
- Phone Pe (Walmart backed)
- Google Pay
- Amazon Pay

Internet, Mobile & Smartphone penetration

Ecosystem Triggers

Entry of Non-traditional player

- Internet users: Increased from **21%** to **61%** in the last 4 years
- Mobile phone users: **1.2B**
- Smartphone penetration: Expected to reach **820M** in 2022

Rising Customer Expectations

- Contactless/mobile payments
- Digital payments for small value transactions -- QR codes
- Reduced dependence on cash for P2P money transfers

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Regulators role in enabling digital payments

Cards

- EMV and Chip Mandate

- Guidelines on Standing instructions

- Payment Aggregator & OPGSP guidelines

Wallets & Neobanks

- Guidelines on onboarding and limits

- Interoperability

Financial inclusion

- Enabling Micro ATM & BC model

- eKYC and digital identification services

Data Storage

- Guidelines for data localization

The CBDC is the same as the currency of the country issued by the central bank but in a different form than paper.
The digital token would fulfil the basic functions of a currency as a medium of exchange, unit of account, store of value, and standard of deferred payment.

A new department has been created with effect from January 4, 2022, by subsuming the fintech division of DPSS, CO.
The department will not only promote innovation in the sector, but also identify the challenges and opportunities associated with it and address them in a timely manner,

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Customer Consent through Account Aggregator (AA) model

The AA framework was created through an inter-regulatory decision by RBI and other regulators including Securities and Exchange Board of India (SEBI), Insurance Regulatory and Development Authority (IRDA), and Pension Fund Regulatory and Development Authority (PFRDA) through and initiative of the Financial Stability and Development Council (FSDC)

Conceptualized by RBI in 2014

Framework launched in 2016
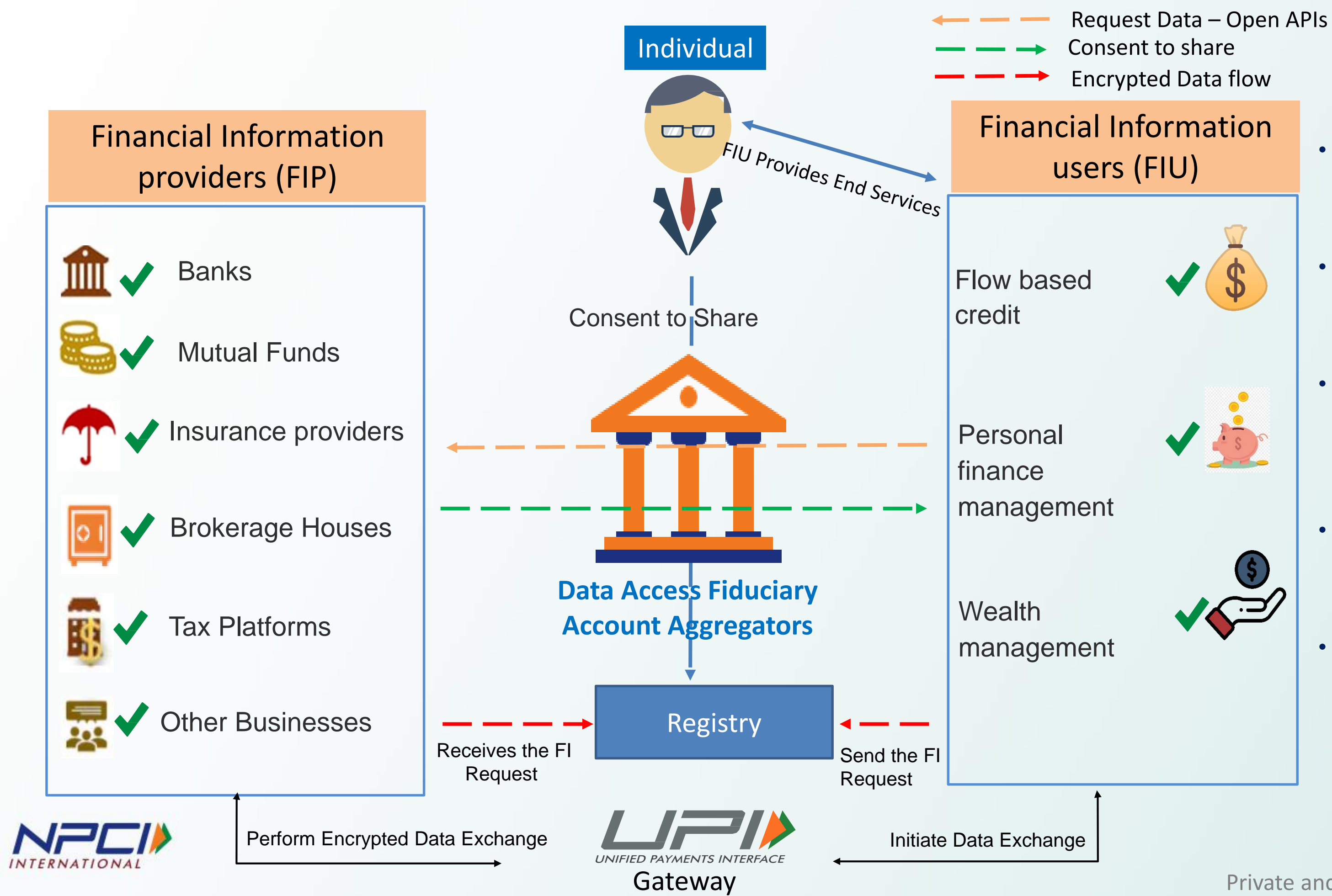
AAs **went live** in Sept 2021
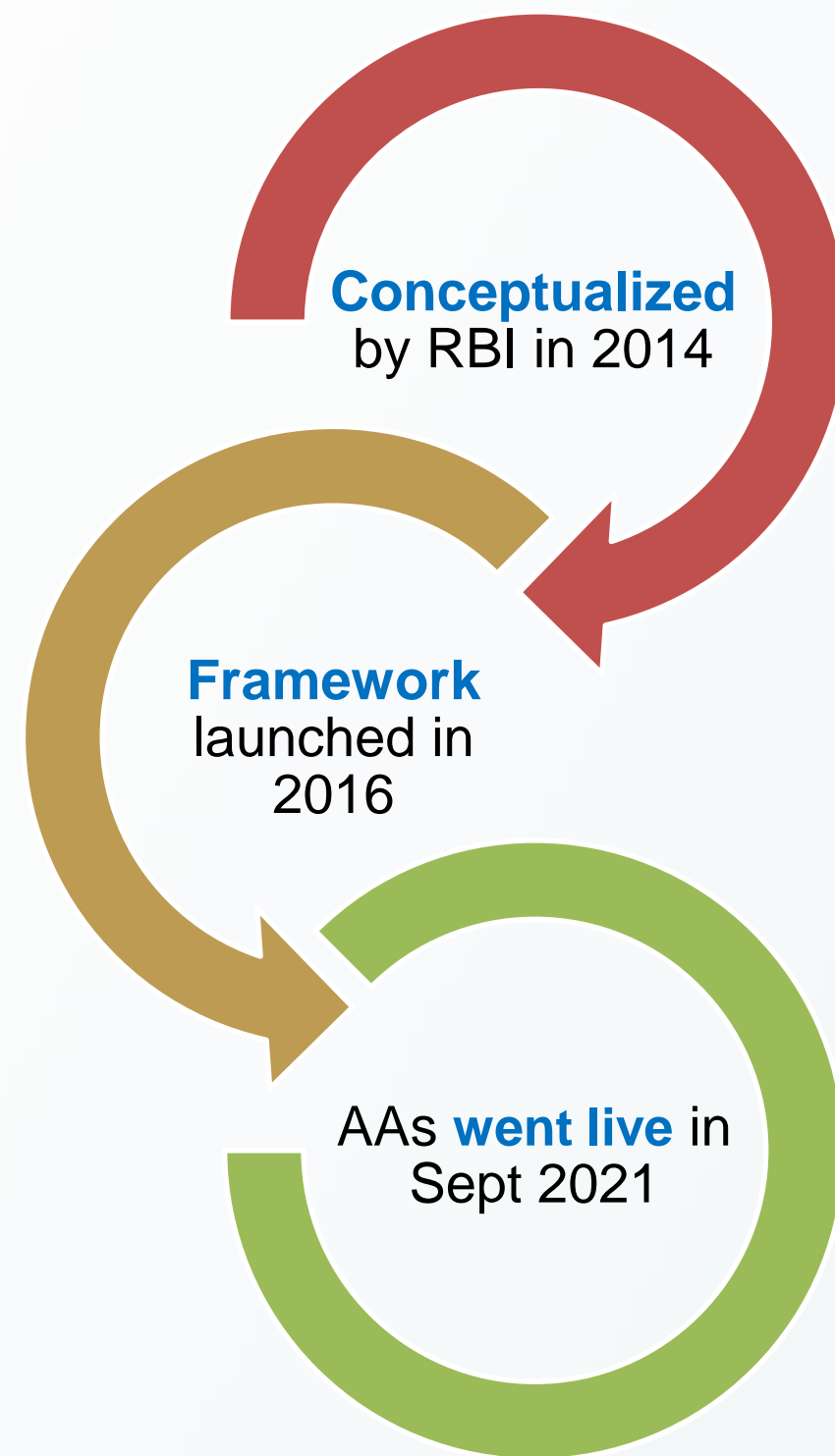
Broad guidelines for AAs as Consent Custodians:

- The license for AAs is issued by the RBI

- User registering with an AAs will be able to **provide or retract consent** for sharing data in any of her/his accounts with an FIP

- User will be able to **choose the period for which the data** can be shared with the FIU

- Presently, only **asset-based data** such as bank savings bank, fixed deposits and investment account details like mutual funds, insurance policies and pension funds is accessible

RBI has confirmed approval to nine AAs – Out of these 4 are live

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Customer Consent through Account Aggregator (AA) model

AAs are not allowed to access, store, or sell the data, only collect and transfer it.

Legend:
- Request Data – Open APIs
- Consent to share
- Encrypted Data flow

Individual

FIU Provides End Services

Consent to Share

Financial Information providers (FIP)

- ✔ Banks
- ✔ Mutual Funds
- ✔ Insurance providers
- ✔ Brokerage Houses
- ✔ Tax Platforms
- ✔ Other Businesses

Data Access Fiduciary Account Aggregators

Registry

Receives the FI Request

Send the FI Request

Financial Information users (FIU)

- Flow based credit ✔
- Personal finance management ✔
- Wealth management ✔

Perform Encrypted Data Exchange

Initiate Data Exchange

Gateway

- UPI users use payments on several accounts through single application, using UPI ID (e.g. abc123@mybank).

- Similarly, an AA entity will enable a user to transfer data held in various accounts to an entity (FIU) seeking access to that data.

- FIU will be able to initiate a consent request to the user along with particulars of the information requested through the AA identifier (e.g. user1@accountaggregator)

- The AA will share the requested data through the UPI application after authorization has been obtained from the user.

- User chooses the period for which the data can be shared with the FIU

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Questions/Answers and Next Steps

THANK YOU