

# Reforming UPI

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## Reforming UPI: Tackling the Challenges Behind System Downtimes

**Context:** In recent months, the **Unified Payments Interface (UPI)**, a cornerstone of India's digital payment system, has faced multiple outages, affecting users of popular apps such as **GPay** and **PhonePe**. These disruptions have raised concerns over the stability and reliability of UPI, especially as it has become integral to the financial ecosystem in India. The outages were primarily triggered by a series of technical issues, involving excessive transaction verification requests from individual banks to the **National Payments Corporation of India (NPCI)**, the body responsible for overseeing the UPI network.

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### How UPI Works

- UPI is built on the **Immediate Payment Service (IMPS)** architecture, which allows real-time, interbank transactions.
  - To initiate a UPI transaction, users must link their bank accounts to a **Payment Service Provider (PSP)** app (such as **PhonePe** or **GPay**) via their mobile number.
  - **Almost all public and private banks** in India are part of the UPI network, ensuring widespread accessibility for users.
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### Interoperability in UPI

- UPI is designed to be **interoperable**, meaning users can access their bank accounts through any UPI-enabled app.
- It allows users to link and use multiple apps simultaneously, enhancing the flexibility and convenience of the system.

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## Role of NPCI in UPI

- Although UPI seems like a peer-to-peer system, **nearly all transactions** are routed through NPCI.
- NPCI is responsible for encrypting the user's **PIN** and forwarding payment details to the payer's bank, which then processes the transaction.
- This central role makes NPCI a **single point of failure** – if NPCI faces downtime, the entire UPI system is disrupted, as banks cannot independently process UPI transactions.

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## Why NPCI Faced Several Outages

- NPCI, a collective of banks with public sector banks holding the majority stake, oversees the design and management of UPI.
- However, much of the implementation responsibility lies with individual banks.
- **Cause of Outages:** The recent outages were caused by individual banks overwhelming NPCI's systems by sending excessive "**check transaction**" requests to verify completed payments, stressing NPCI's infrastructure.

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## Introduction of UPI Lite

- To mitigate the impact of downtimes, NPCI introduced **UPI Lite**, which allows users to make small payments (up to **₹2,000**) without entering a PIN.
  - **UPI Lite** transactions still pass through NPCI servers for **device verification**, meaning NPCI remains a critical intermediary in this process.
  - Despite UPI Lite, NPCI continues to be the **single point of vulnerability** for all UPI transactions.
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## Why Banks Are Displeased with UPI

- **Lack of Revenue:** Banks incur around **₹0.80 per transaction** to cover costs like **SMS notifications** and maintaining payment records. However, banks cannot charge **Merchant Discount Rate (MDR)** for UPI transactions, limiting their ability to generate revenue from these services.
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### Impact on Bank Incentives

- Without the ability to charge MDR, banks have limited incentives to maintain high **uptime standards** for UPI services.
  - This lack of motivation results in **more frequent outages** and increased payment declines, impacting users and businesses alike.
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### Comparison with Card Networks

- Commercial card networks like **MasterCard** and **Visa** experience fewer and shorter downtimes, owing to **better monitoring** and enforceable **Service Level Agreements (SLAs)** that ensure consistent performance.
  - The contrast between the uptime reliability of card networks and UPI highlights the challenges that the latter faces in ensuring stability.
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### Government's Incentive Program for Banks

- To improve the situation, the **Ministry of Electronics and Information Technology (MeitY)** has introduced a "**carrot and stick**" approach, aimed at incentivizing banks to improve UPI uptime.
- An **annual UPI incentive program** rewards banks based on their performance and penalizes those with poor uptime.
- Banks with the lowest performance in uptime **receive no compensation**, ensuring that only those meeting uptime standards benefit from government incentives.

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## Conclusion

The recent UPI outages underscore the challenges associated with a highly centralized system where NPCI plays a pivotal role. Despite the introduction of features like **UPI Lite**, the dependency on NPCI as a **single point of failure** continues to make the system vulnerable. Addressing this issue is crucial for ensuring the long-term success of UPI, particularly in light of its role in India's digital payments revolution. Strengthening the infrastructure, improving bank incentives, and ensuring better uptime standards are critical steps for enhancing the resilience of UPI and maintaining its role as a cornerstone of India's financial ecosystem.



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