

MOBILE MONEY SERVICES TESTING



Mobileum today

MOBILEUM IS AN ACTIONABLE ANALYTICS COMPANY



INDUSTRY INFLUENCE

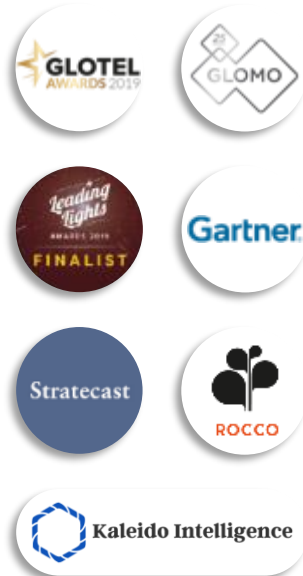
GSMA, CFCA, RAG, PTC, BEREC, ETSI, 5G Infrastructure Association

IR.81 GRQ, VoLTE Testing Leader

FS.20 Co-authorship



MARKET RECOGNITION



CUSTOMERS

1,000+

In more than 180+ Countries. Over 9 in 10 telecom operators use Mobileum



INTELLECTUAL CAPITAL

307

patent applications

178

awarded



GLOBAL PRESENCE

1,800+
Global Team

HQ:
Cupertino, USA

Amman, Athens, Bangalore, Braga, Bristol, Buenos Aires, Cairo, Dubai, Gurgaon, Hong Kong, Istanbul, Jakarta, Lisbon, Melbourne, Mumbai, Nuremberg, Sao Paulo, Singapore, Texas, Washington DC



PRODUCTS

roaming & core network

risk management

network security

testing & monitoring

engagement & experience



Agenda

1. Mobile Money QoE
2. Smartphone-based Testing for Mobile Money
3. Reports and Dashboards
4. Summary

Who enables Mobile Money?



mobile networks

&

mobile money platforms

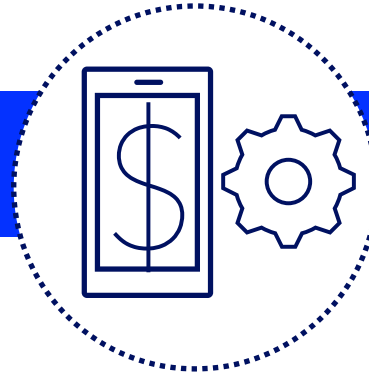


The three pillars of successful Mobile Money Services



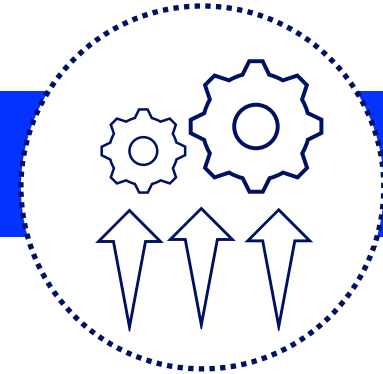
Availability & Performance

- Available platforms & mobile network services
- Money transfer management process that generates accurate reports
- Transactions occur within acceptable time
- Network outages do not impact MoMo App



Mobile Money App Reliability

- Accurate money transfer through SIM Application Toolkit, App, USSD and SMS
- Money is neither lost nor duplicated
- Correct transaction fee
- Transaction details are viewed by the correct user



Business Partner Interaction

- Successful transactions between platforms and networks
- Seamless third-party integration and interaction



Why is testing of Mobile Money services needed?

Telecom
Regulators



Mobile operators providing
MoMo Services



Need **transparency** about end-to-end user perception of the
quality of Mobile Money Services,
in combination with network service **availability**.



Satisfied
End-Customer



Regulators must...

REGULATORS



- Benchmark service providers
- Set meaningful targets for service quality
- Monitor and understand Quality of Service and Quality of Experience of mobile money transactions provided by MoMo operators



MoMo operators and providers must...

OPERATORS & SERVICE PROVIDERS



- Monitor 24/7 MoMo services availability
- Plan service provisioning to ensure regulatory compliance and consumer satisfaction
- Enhance service performance and user experience
- Allow easier onboarding of a new partner (agent, merchants, bill payment aggregators, financial service providers, utility providers, etc.)
- Troubleshoot before customers' complaints (e.g. in case that money has been deducted on A side, but not transferred to B side)
- Check the cause and impact of the network and other services against performance of MoMo transaction (if a mobile money transaction failure has been caused by network outage or not)



Mobileum Mobile Money Services Active Testing Solution

Robust telco grade test solution for MoMo services

MoMo KPIs and measurements fully aligned with ITU-T QoS and QoE aspects *

24/7 automated periodic testing of mobile money transfer services

Tests across App, SIM Application Toolkit & USSD communication

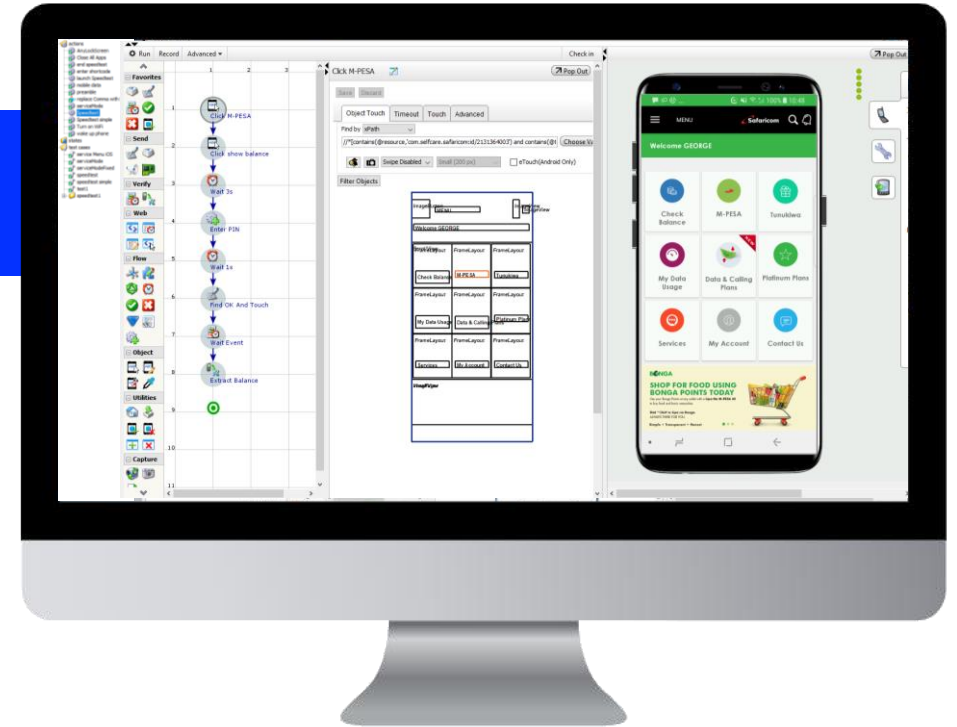
Fully supports android and iOS devices

*Based on the ITU-T document “Methodology for measurement of QoS KPIs for DFS”



The backbone of Mobileum Mobile Money Active Testing Solution

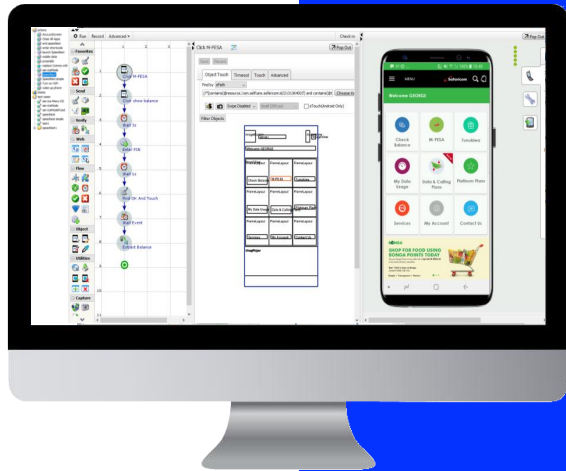
Smartphone Experience **Interactive Scripting Studio**



Blue LU NextGen Smartphone Based Testing Platform



An interactive scripting studio



MOBILE MONEY TEST SCRIPT

START

A side

B side

INITIALIZING
DEVICE

CHECKING BALANCE
BEFORE TRANSACTION

INITIALIZING
DEVICE

CHECKING BALANCE
BEFORE TRANSACTION

SENDING THE MONEY
Selecting "Transfer Money"
Setting the number and amount
Setting and confirming PIN
Waiting for successful notification
Waiting for SMS

EXTRACTING TRANSACTION DETAILS
AND NEW BALANCE

CHECKING SMS AND EXTRACTING
TRANSACTION DETAILS AND NEW BALANCE

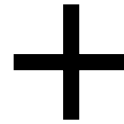
END



How is Mobileum MoMo Testing Solution deployed?



Blue LU



Scripting Studio



**Mobileum
Mobile Money
Testing Solution**

1. Blue LU (android or iOS) is sent to the customer
2. Mobileum Professional Services for script customization are included (up to 5 days)
3. In **2 weeks** Customer receives reports, dashboards and alarms
4. Overall project delivery is **4 weeks**

The Blue LU tests:

- **Any App or SIM Application Toolkit**, as customer's own test flow can be created/recorded directly on the phone
- **USSD services** – main service for the mobile money transaction **on the feature phones**
- Network services, such as SMS and data



MoMo test results



The script captures:

- A & B number
- Transaction ID
- Balance on A & B side, before and after transaction
- Transaction fee
- Sent & received money amount
- Duration between issuing balance check and receiving information
- ITU-T timers and rates (see next slide)
- Overall Money Transaction duration
- Overall Money Transaction Success Rate



The ITU-T Mobile Money recommended KPIs for active testing

MTCR

Money Transfer Completion Rate

MTCT

Money Transfer Completion Time

MTFPR

Money Transfer False Positive Rate

MTFNR

Money Transfer False Negative Rate

MTASSR

Money Transfer Account Stabilization Success Rate

MTLR

Money Transfer Loss Rate

MTDR

Money Transfer Duplication Rate

MTAST

Money Transfer Account Stabilization Time



Reports & insights: Money transaction testing overview

MOBILE MONEY Update every 2 minutes next in 01:58

Search Navigation [Icons]

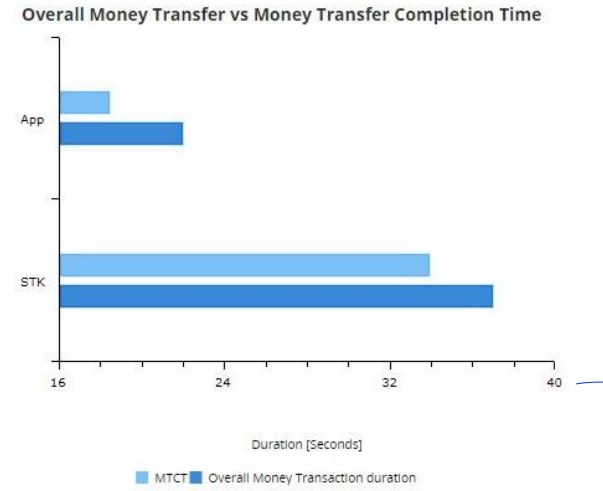
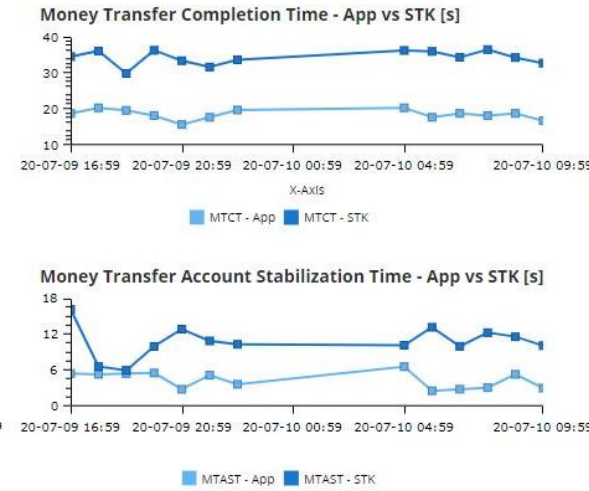
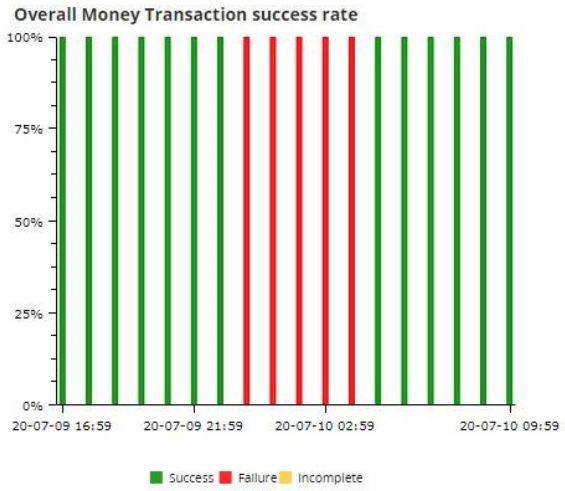
Period: Fixed: 2020-07-09 16:00:00 until 2020-07-10 10:00:00

Mobile Money overview

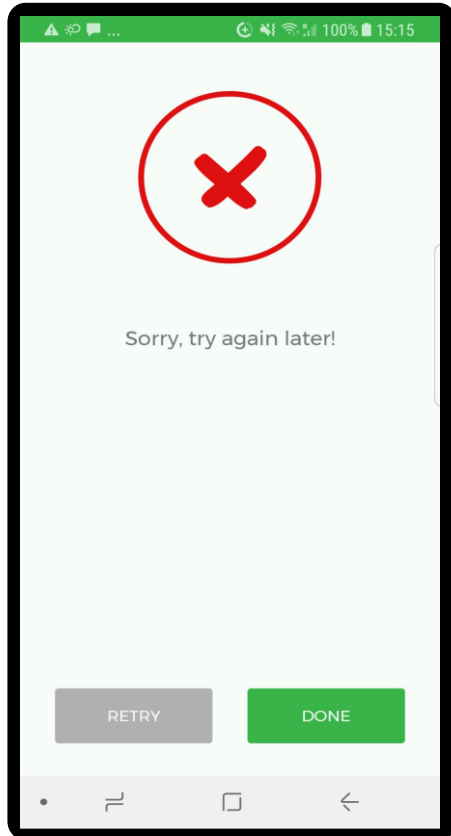
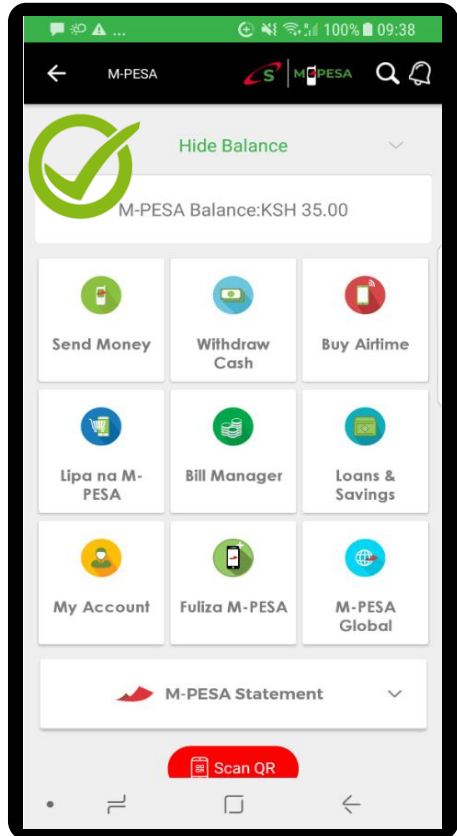
Timestamp	TransactionID	Originator	MTCR	MTASSR	MTFPR	MTFNR	MTLR	MTDR	MTCT	MTAST	OverallMTDuration	Amount_sent	Amount_received	A_balance_before	A_balance_after	B_balance_before	B_balance_after	TransactionFee	_nur
2020-07-10 09:31:07	OGA9ML46LF	App	1	1	0	0	0	0	22409	5655	27050	2	2	31	29	569	571	0	011171
2020-07-10 09:11:45	OGA0MKQ6BA	App	1	1	0	0	0	0	34623	10390	38701	2	2	571	569	29	31	0	011171

Timestamp ⇅ TransA_balance_before ⇅ A_balance_after ⇅ B_balance_before ⇅ TransactionFee

2020-07-10 06:41:46	OGA9ML46LF	App	1	1	0	0	0	0	22409	5655	27050	2	2	31	29	569	571	0	011171
2020-07-10 06:20:28	OGA0MKQ6BA	App	1	1	0	0	0	0	34623	10390	38701	2	2	571	569	29	31	0	011171
2020-07-10 05:41:43	OGA0MK9DUG	App	1	1	0	0	0	0	17239	5186	21396	2	2	31	29	569	571	0	011165
2020-07-10 05:19:27	OGA8MK32YW	App	1	1	0	0	0	0	40165	14283	43947	2	2	571	569	29	31	0	011171
2020-07-10 04:49:47	OGA6MJYA38	App	1	1	0	0	0	0	36254	10203	39270	2	2	571	569	29	31	0	011171
2020-07-10 04:42:09	OGA5MJXDH1	App	1	1	0	0	0	0	20373	6620	25982	2	2	31	29	569	571	0	011165



Findings



- Money Transfer Account Stabilization Success Rate is a very important KPI because it verifies all information, whether the balance was correctly depleted on A side, and correctly transferred to B side based on summary SMSs
- Money Transfer takes shorter time using App in comparison with using STK
- It takes approximately same time to receive confirmation SMS for both App and STK money transactions
- Screen shots are provided as result files



Mobileum's Mobile Money testing solution in short

Summary

- It is a full testing suite for testing and monitoring Mobile Money and Mobile Network services
- It identifies and locates problems precisely
- It checks the success rate and completion time of money transfers

THANK YOU



mobileum

Action driven by intelligence



Back up



Description of the ITU-T KPIs

MTCR

Money Transfer Completion Rate:

Percentage of successful committed transaction against attempted transactions.

MTCT

Money Transfer Completion Time:

Time to complete a money transfer.
The time between selecting „Transfer Money“ and the primary success indicator (the summarizing SMS are not considered).

MTFPR

Money Transfer False Positive Rate:

Rate that a transfer completion was successful, but balance unchanged on A and B side.

MTFNR

Money Transfer False Negative Rate:

Rate that a money transfer is reported as unsuccessful but in fact has taken place (i.e. money has been transferred).

MTASSR

Money Transfer Account Stabilization Success Rate:

Rate that a DFS transfer leads to a consistent account on both sides when all information is considered (i.e. primary status information on the A side, and summary information on A and B side).

MTLR

Money Transfer Loss Rate:

Rate that a money transfer ends in a loss, i.e. money is deducted on the A side but not credited on the B side.

MTDR

Money Transfer Duplication Rate:

Rate that a money transfer is credited to the B side but is not deducted from the A side account.

MTAST

Money Transfer Account Stabilization Time:

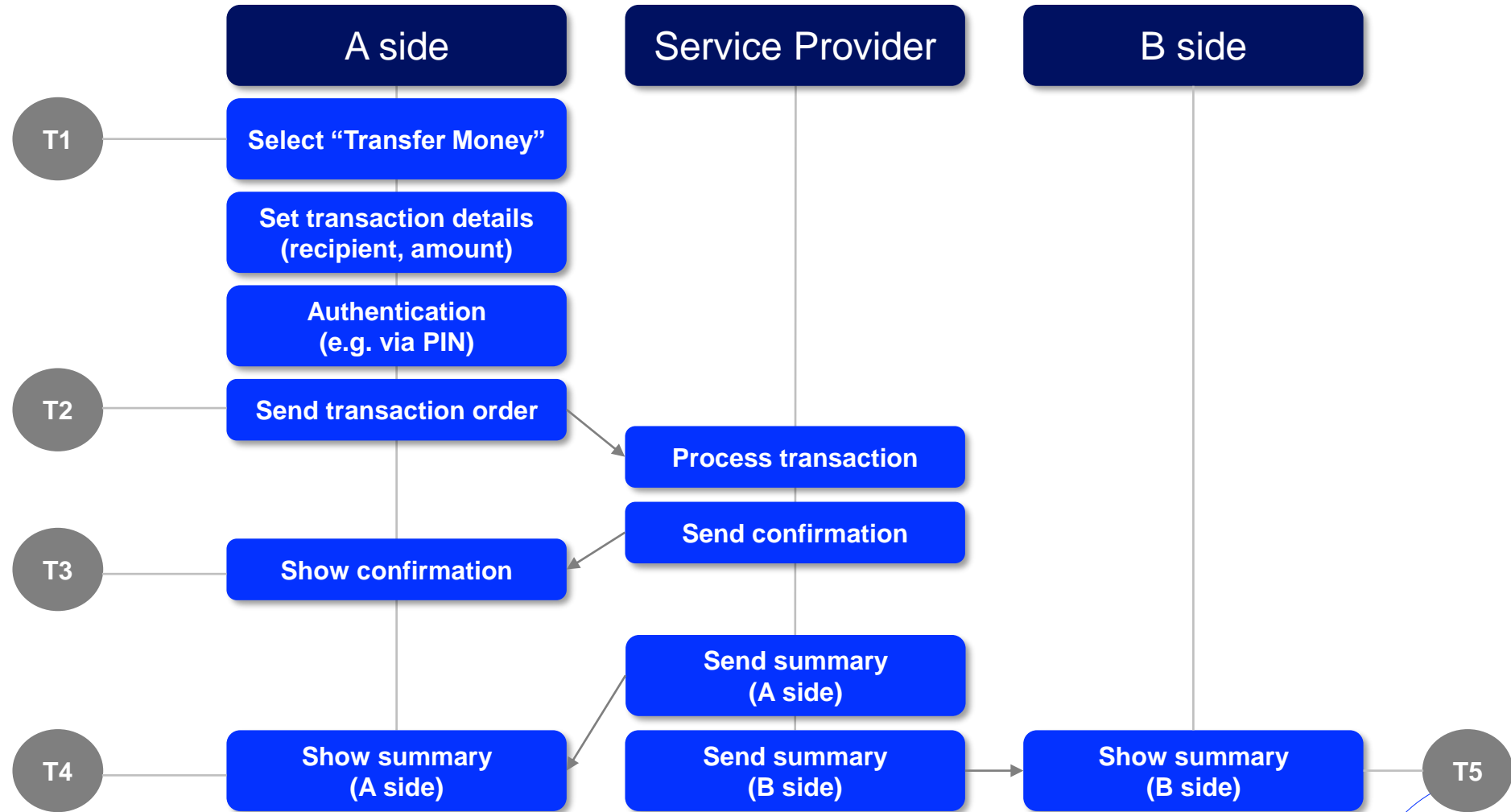
Time after triggering the DFS money transfer until all status and account information are correct and consistent.
First trigger point: Enter PIN and confirm.
Stop time: when the last of the A and B side summary messages have been received.



Definition of the main timers

Money Transfer Completion Time
 $MTCT = T3 - T1$

Money Transfer Account Stabilization Time
 $MTAST = \max(T4, T5) - T2$





Abbreviation

QoS	Quality of Service	MTCR	Money Transfer Completion Rate
QoE	Quality of Experience	MTCT	Money Transfer Completion Time
DFS	Digital Financial Services	MTFPR	Money Transfer False Positive Rate
KPI	Key Performance Indicator	MTFNR	Money Transfer False Negative Rate
SMS	Short Message Service (also used for a single text message transmitted by SMS)	MTFNRR	Money Transfer Failed Transaction Resolution Rate
PIN	Personal Identification Number	MTASSR	Money Transfer Account Stabilization Success Rate
MoMo	Mobile Money	MTAST	Money Transfer Account Stabilization Time
STK	SIM Toolkit	MTLR	Money Transfer Loss Rate
App	Mobile Application	MTDR	Money Transfer Duplication Rate
ITU	The International Telecommunication Union		
FIGI	the Financial Inclusion Global Initiative		
USSD	Unstructured Supplementary Service Data		