



*Global Clearing  
and Fare System*



# TECHNOLOGY AT WORK FOR YOU

A FARE SYSTEM THAT REFLECTS ELEGANCE IN SIMPLICITY.

A SCALABLE HIGH PERFORMANCE FARE SYSTEM AND CLEARINGHOUSE THAT IS ELEGANT IN ITS SIMPLICITY.

For two decades, MSI Global has been designing, developing and providing consultancy services for fare and pre-paid smart card systems globally including Singapore, Thailand, Ireland, Malaysia, Taiwan, China and India. Drawing on experiences gathered from these fare systems and clearinghouse projects, MSI developed G-clef – the next generation Global Clearing and Fare System. Based on the current Symphony for ePayment (SeP) in Singapore, G-clef can be implemented easily while still retaining the cutting edge features of SeP.

G-clef provides the following as standard features which are readily scalable:

- Single/Multiple Card Issuers
- Single/Multiple Rail or Bus Operators
- From 0.5 Million to 20 Million Card Base or more
- From 1 Million to 10 Million Rides or more
- From 2 Million to 20 Million Financial and Non-Financial Transactions or more
- Connections to thousands of ePayment Devices
- On-Line Transaction Processing
- End-Of-Day processing duration of 3 hours

It caters to the needs of small to very large systems.



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# FLEXIBLE SOLUTIONS FOR YOUR FARE COLLECTION NEEDS



## A COMPLETE TRANSIT AND CLEARINGHOUSE SOLUTION

A complete back-end transit solution that integrates the functions of an Issuer, Transit Acquirer and Transport Operator into one system that is easily managed. You pay only for the features you need. G-clef can be easily implemented and used for most transit-related fare collection systems as well as e-purse clearinghouse systems increasing efficiency, reducing cost and improving revenue collection and distribution.

## TO MEET DIFFERENT NEEDS

G-clef can cater to the different requirements and levels of maturity of various transit systems and smartcard clearinghouse systems all over the world. G-clef was developed with a global perspective to allow scalability, robustness, and ease of enhancements to meet the varying needs for different transit and clearinghouse systems worldwide.

## SCALABLE

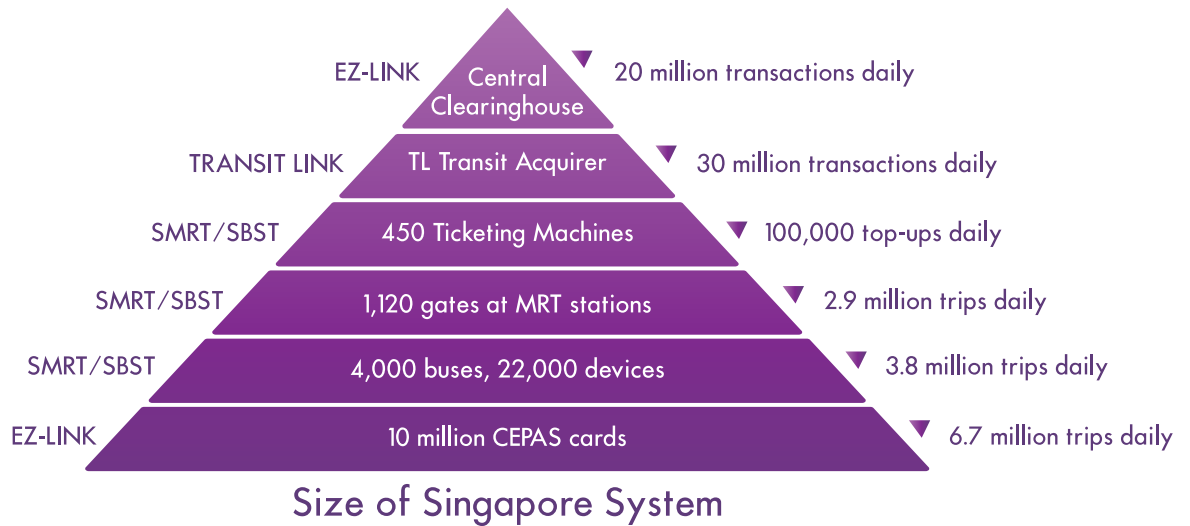
G-clef has proven to work efficiently for a daily average 20 million transactions generated by the public transport commuters in Singapore. While you might just need a smaller system now, have no qualms that it can be scaled up as required on with the same software.

## COST EFFECTIVE

One of the success factors for keeping our public transport fares low in Singapore is due to the clearinghouse solution SeP that G-clef is based on. This is achieved by having an efficient and cost effective clearinghouse and fare system that minimises fare leakage.







### ON-LINE TRANSACTION PROCESSING

Unlike most fare systems, our solution processes transactions and messages online. This reduces the time for the end-of-day processes and allows reports to be ready in time for use the following day.



### RECOVERY OF MISSING TRANSACTIONS

Missing transaction will be a problem of the past with G-delf. It employs an advanced recovery process: missing transactions are tracked and recovered which reduces losses to both Card Issuer and service providers. The reconciliation process will allow any ambiguity to be resolved. This ensures accurate reporting for the Issuer, Transit Acquirer and Transport Operator.



### REPORTING AND REVENUE COLLECTION

Timely reporting is crucial to system operators and their auditors. Having this aspect in mind, G-delf provides a wide spectrum of reports to meet the multitude of needs, tested and proven by transport operators to conform to the financial best practices as validated by established auditors.

# G-clef Sub-systems

## 1. CARD MANAGEMENT

- Handles transactions affecting card status, card information and purse updates
- Card Master will reflect the changes and live status of each card

## 2. FINANCIAL MANAGEMENT

- Performs all financial related activities
- Summarizes all financial data for settlement, apportionment and reconciliation

## 3. BLACKLIST MANAGEMENT

- Manages the maintenance, monitoring and distribution of blacklist records
- Provides means to disable, limit further usage and track blacklisted cards

## 4. PARAMETER MANAGEMENT

- Defines, maintains and downloads parameters within and out of the system

## 5. REFUND MANAGEMENT

- Manages processes for immediate and deferred refunds of cards and passes
- Allows filing of refund request, approving and declining of request and refund handling

## 6. PASS/PRODUCT MANAGEMENT

- Manages pass/product master in the system
- Handles maintenance, tracking and monitoring of pass/products

## 7. AUTOLOAD MANAGEMENT

- Manages autoload enabling, disabling of cards and bad debt payments

## 8. FINANCIAL CLAIMS MANAGEMENT

- Handles claims from system participant for valid transactions that failed settlement
- Allows claims to be filed, approved or declined

## 9. ACCESS CONTROL

- Manages security validation and authentication facility for access by the user

## 10. REPORT MANAGEMENT

- Provides reports for users required for business operations and financial status
- Permitted users are able to view print, export and schedule reports



## 11. MESSAGE MANAGEMENT

- Receives, packages, validates and distributes transactions and parameters files

## 12. JOB MANAGEMENT

- Provides facilities to run, schedule and maintain pre-determined jobs in the system

## 13. SYSTEM MANAGEMENT

- Provides the facility to maintain system properties used by the application

## 14. HOUSEKEEPING MANAGEMENT

- Allows users to define data purging and archival criteria for database tables

## 15. STOCK MANAGEMENT

- Allows user to define and track stocks
- Reflects number of cards issues, refunded or replaced
- Alerts when stocks are low

## 16. DEVICE MANAGEMENT

- Allows user to define and track devices accepted in the system
- Manages commissioning, decommission and blacklisting of devices

## 17. AUDIT REGISTER MANAGEMENT

- Processes audit register transactions sent by card processing devices
- Allows cross checking of transactions amounts and volumes using audit register data

## 18. EVENTS MANAGEMENT

- Manages event information sent by device
- Allows user to monitor device status from back office

## 19. ADAPTOR TO DEVICES

- Supports interfacing to devices using an adaptor



# G-clef ePayment System

## FEATURES OVERVIEW

### DIFFERENTIATING FACTORS

- Cost effective yet high performance
- Ready to use, out-of-the-box solution
- Minimized fare leakage to < 1%
- Accuracy of reconciliation to 99.99%
- Allows processing of all ISO compliant cards
- Supports multiple issuers
- Financial integrity validated by major Public Accounting Firms

### BASIC SPECIFICATIONS

G-clef has the following capabilities that can be scaled to suit a range of performance requirements

- 1 Card Issuer \*
- 1 Rail Operator or Bus Operator \*
- 0.5 Million Card Base \*
- 1 Million Rides \*
- 2 Million Financial and Non-Financial Transactions \*
- Connections of up to 500 ePayment Devices \*
- On-Line Transaction Processing
- End-Of-Day processing duration of 3 hours

\*System is scalable to different requirements.

### SUB-SYSTEMS

G-clef provides the following functionalities through the corresponding sub-systems:

- Message Management
- Card Management
- Parameter Management
- Access Control
- Report Management
- Financial Management
- Job Management
- Refund Management
- Pass Management
- Autoload Management
- Blacklist Management
- System Management
- Financial Claims Management
- Housekeeping Management
- Stock Management
- Device Management
- Audit Register Management
- Events Management
- Adapter To Devices



## G-clef ePayment System

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