



BANK OF PAPUA NEW GUINEA

National Payments System Development Project

Request for Proposals for an Automated Transfer System

**Port Moresby
December 2010**

IN CONFIDENCE

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1. Introduction and Background

1.1 *Papua New Guinea*

Papua New Guinea (PNG) is a country in the south-west Pacific with a land area of approximately 450,000 square kilometres. It covers the eastern half of the island of New Guinea together with a large number of smaller islands.

Some 12-15 per cent of the population of approximately six million live in a small number of urban centres, of which the largest is the National Capital District (NCD) surrounding the capital, Port Moresby. These centres are well-served with modern infrastructure, including well-developed banking services.

The rest of the population is spread throughout the country in smaller towns, villages and thousands of rural communities, many of which are very small and remote. In general the infrastructure in the more remote communities is very underdeveloped, and, due to the challenging nature of much of the terrain, not all communities are yet interconnected by road. In recent years both coverage and usage of mobile telephones have grown rapidly, although many communities are still not covered.

The economy is currently experiencing a high level of growth, based on extensive mineral resources including copper, gold, nickel, oil and gas, and agricultural commodities such as vanilla, palm oil, copra, cocoa and coffee. In particular some USD 15 to 16 billion are expected to be spent during the next three to four years on the development of a Liquefied Natural Gas (LNG) facility which, when completed, will be possibly the largest of its type in the world. This expenditure is 1.8 times the estimated nominal Gross Domestic Product of Papua New Guinea and is already having a significant impact across the economy. In recognition of this impact, the central bank has identified a number of matters to address in the immediate future, two of which are of particular relevance to this RFP:

1. *The development and implementation of a national payments systems that will be geared toward dealing with instruments of a fully developed country with all the payment mechanisms used in today's world; and*
2. *Ensuring that financial services are available to the people “unbanked population” wherever they are, through developing the Microfinance industry and the rural banking facilities by all the banks and financial institutions operating in the country, telephone, including mobile phone and internet banking.*¹

1.2 *National Payments System Development Programme*

The Bank of Papua New Guinea (BPNG) is the central bank of PNG and has the responsibility under the Central Banking Act 2000 to “promote an efficient national and international payments system”. The Papua New Guinea payments system has evolved over a considerable time to encompass a variety of payment instruments,

¹ Speech by Deputy Governor Popoitai to the Papua New Guinea –Australian Business Council Forum, Townsville, May 2010 – see <http://www.bankpng.gov.pg/speeches-mainmenu-95.html>.

institutions, arrangements and legislation, which are at varying stages of development.

During 2008/2009 BPNG undertook a review of the National Payments System (NPS) of Papua New Guinea, based on needs and intentions articulated in BPNG's *2005-2008 Strategic Plan*. The objective of the review was to identify areas where the NPS might be reformed and modernised in order to ensure, first, that it is fully able to support the use of safe, efficient, modern payment instruments and methods (particularly electronic payments) and, second, that full and equal opportunities are available for all citizens and organisations to participate in the NPS. This is particularly important in the present economic environment, where a number of factors make it timely to modernise the NPS:

1. The PNG economy is growing rapidly;
2. Volumes of payments are expected to increase significantly as economic activity continues to grow;
3. As economic activity, and hence payment volumes, grow, so do risk levels, particularly systemic risk, which may act as a disincentive to participate in economic activity in PNG;
4. A very large proportion of the economy is cash-based, which not only inhibits economic growth and is inefficient and in many cases inconvenient, but also provides incentives and opportunities for crime;
5. With the exception of debit cards in the larger centres, the only interbank payment instruments are paper-based: there is a general lack of convenient and efficient electronic interbank payment instruments and circuits;
6. While the majority of the population has hitherto been outside the formal financial system (particularly in rural areas), a number of hitherto 'unbanked' areas of society are now entering it via institutions such as Savings and Loans Societies and microfinance institutions;
7. Despite the previous observation, the percentage of the population without access to payment instruments and circuits other than cash remains very high;
8. Given the current favourable economic climate, it is likely that a variety of new players may enter the banking and financial markets.

The review was carried out in wide consultation with stakeholders from the banking, financial, government and business communities and resulted in the production of a strategy for development of the future NPS and an action plan for executing the development activities identified in the strategy. Further information on the NPS Development Programme can be found on BPNG's website www.bankpng.gov.pg.

1.3 This RFP

BPNG has now embarked on the next stage in the NPS reform process and, as a first step, is planning to implement an Integrated Payments Processing System (IPPS), which will form the foundation of the new NPS. The IPPS will conform with current best practice and with international principles and recommendations, particularly the CPSS *Core Principles for Systemically-Important Payment Systems* and the CPSS-IOSCO *Recommendations for Securities Settlement Systems*. It will comprise two

main components, namely an Automated Transfer System (ATS) and a Government Securities System (GSS). This RFP is issued for the supply and implementation, on a turnkey basis, of the ATS component, and proposals are invited from qualified companies for:

1. Supply of application software;
2. Specification (but not supply or installation) of all required hardware, system software, database management software, middleware and networking components;
3. Integration of the ATS with the GSS component (see 1.3.1 below) and other information systems both within BPNG and in external organisations including commercial banks and government entities;
4. The complete range of required services including project management, business and functional specification, software tailoring and customisation, installation, implementation, testing, training, documentation and ongoing support of the installed system.

Proposers are requested to submit full and detailed proposals for the ATS in accordance with the instructions to proposers contained in section 8. Proposers should note that BPNG intends to purchase any necessary hardware, system software, middleware and related components itself following the recommendations of, and in consultation with, the successful proposer. The successful proposer will be required to commit contractually that the agreed hardware will be sufficient to operate the ATS to the required level of performance.

Proposers should also note that BPNG wishes to procure the ATS and associated services as a single lot, and that part-bids will not be accepted. However, proposers are welcome to enter into 'teaming' arrangements with other companies, provided always that BPNG intends to enter into a contract with only one company.

1.3.1 Components of the RFP

As stated above, this RFP is primarily for an **Automated Transfer System (ATS)** which will provide functionality for clearing and settling all electronic interbank payment instruments, both high and low value, within one integrated software package. It will have two main functions:

- (i) A real-time gross settlement (RTGS) function for large value and time critical payments; and
- (ii) An automated clearing function, which will provide netting and clearing facilities for the full range of low value (retail) electronic instruments including direct debits, direct credits, electronic cheque records and bulk transfers (e.g. for salaries).

Both elements will be tightly-integrated within a single system (the ATS) so as to ensure seamless clearing and settlement of all domestic interbank obligations on a same-day basis with finality and irrevocability of both payment and settlement.

The ATS component will be interfaced to the in-house core banking systems operated by the commercial banks, to provide fully automated Straight-Through Processing (STP). Within BPNG it will be integrated with BPNG's accounting and

financial management system (Oracle Financials version 11i) and the Comprehensive Reserves Management System (CRMS) which is used to manage BPNG's foreign reserves. It will also act as an important data source for BPNG's future data warehouse. In addition the ATS will support interfaces to a number of systems operated by agencies of the Government of PNG, including the Department of Finance, the Customs Service, the Internal Revenue Commission and the Department of Treasury.

BPNG intends that the ATS will be closely coupled to its existing Registry and Money Market System (RMS) for the purposes of:

- Enabling Delivery versus Payment (DvP) for transactions in Government and BPNG securities;
- Supporting the process of intraday liquidity management for the ATS component.

RMS provides a range of functions for the management of securities issued by the Government of Papua New Guinea (GPNG) and BPNG, including registry/depository, primary auction, change of ownership, maturity calculations and management of BPNG's own domestic portfolio. As noted, it is BPNG's intention to continue using the RMS for these purposes, and for the ATS to be interfaced to it. The successful proposer will be expected to work with the supplier of RMS in implementing this interface. However, in case it emerges that interfacing the ATS and RMS is infeasible, proposers are requested also to provide – **for information only at this stage** – details of packaged Central Securities Depository (CSD) application software which they are able to provide.

1.3.2 Structure of the RFP

This RFP is structured as follows:

- **Section 1 – Introduction and Background** (this section).
- **Section 2 – Current Situation** describes the present situation and arrangements in PNG which are of relevance to this RFP.
- **Section 3 – Scope of this Procurement** provides an overview of the goods and services which BPNG wishes to procure via this RFP.
- **Section 4 – Common System Requirements** provides detailed specifications that are applicable to both the ATS and the CSD (if procured) elements of the IPPS.
- **Section 5 - Specific Functional Requirements for the Automated Transfer System.**
- **Section 6 – Specific Functional Requirements for the Government Securities System.**
- **Section 7 – Implementation and Support** specifies the service requirements that must be satisfied to ensure successful implementation of the IPPS.
- **Section 8 – Instructions to Proposers** contains: (i) BPNG's requirements for the contents and submission of proposals; (ii) an explanation of the procurement process to be followed; and (iii) information on contractual terms and conditions.

1.4 Abbreviations and Definitions

ACH	Automated Clearing House.
ASX	Australian Stock Exchange.
ASYCUDA	Automated System for Customs Data. A computer system developed for Customs administrations by UNCTAD (q.v.).
ATM	Automated Teller Machine.
ATS	Automated Transfer System.
BIS	Bank for International Settlements.
BPNG	The Bank of Papua New Guinea.
BSP	Bank South Pacific.
CBB	Central Bank Bill.
CDC	Currency Distribution Centre.
CMP	Cheque Matching Process (carried out by BPNG on cleared government-issued cheques).
CPSS	Committee on Payment and Settlement Systems.
CRMS	Comprehensive Reserves Management System.
CRR	Cash Reserve Requirement.
CSD	Central Securities Depository.
DoF	Department of Finance.
DoT	Department of Treasury.
EFTPOS	Electronic Funds Transfer at Point of Sale.
ESA	Exchange Settlement Account. An account held by a commercial bank at BPNG for the purposes of settlement of daily clearing operations, interbank payments, purchase of securities, receipt of maturity payments on securities, and settlement of the PGK leg of forex transactions.
GDP	Gross Domestic Product.
GL	General Ledger.
GPNG	Government of Papua New Guinea.
GUI	Graphical User Interface.
ICCC	Independent Consumer and Competition Commission.
IFMS	Integrated Financial Management System. A project under way at the Department of Finance to implement a new electronic financial management system for the whole GPNG.
IOSCO	International Organisation of Securities Commissions.

IPPS	Integrated Payments Processing System.
IRC	Internal Revenue Commission. A branch of the Ministry of Finance and Treasury, responsible for collection of tax revenues.
ISP	Internet Service Provider.
LAN	Local Area Network.
LNG	Liquefied Natural Gas.
MICR	Magnetic Ink Character Recognition.
MMOC	Money Markets Operations Committee (of BPNG), which implements monetary policy.
NBFI	Non-Bank Financial Institution.
NCD	National Capital District (of PNG).
PA	Payment Advice. An order from a government department to BPNG to make a high value payment to a specified account.
PETS	Port Moresby Stock Exchange Electronic Trading System.
PGAS	PNG Government Accounting System. A computer-based system currently operated by the Department of Finance.
PGK	Papua New Guinea Kina (local currency).
PMV	Public Motor Vehicle.
PNG	Papua New Guinea.
PNGFIU	Papua New Guinea Financial Intelligence Unit.
POMSoX	Port Moresby Stock Exchange.
RABB	Record of Arrangements Between Banks.
RMS	Registry and Money Market System. The computer system currently used by the Financial Markets Department of BPNG to hold records of securities holdings and to support the primary auctions of BPNG and GPNG securities.
RTGS	Real Time Gross Settlement.
S & L	Savings and Loans.
SAN	Storage Area Network.
SIGTAS	Standard Integrated Government Tax Administration System.
SLA	Service Level Agreement.
SMK	Salim Moni Kwik. A fax-based domestic money remittance service (in PGK only) offered by Post PNG.
STP	Straight-Through Processing.
UNCTAD	United Nations Conference on Trade and Development.
USD	United States Dollar.

WiMAX	Worldwide Interoperability for Microwave Access. A wireless technology for high-speed data networking.
WPA	Waigani Public Account (GPNG's consolidated account at BPNG).

2. Current Situation

2.1 *Institutional Structure*

The PNG National Payments System at present basically comprises two sectors: the 'formal' banking sector and the non-bank financial sector. Both of these sectors are licensed by, and are subject to the supervision of, BPNG.

2.1.1 'Formal' Banking Sector

This sector covers the licensed commercial banks, of which there are currently four:

- ANZ Bank PNG Limited, which is a locally-incorporated subsidiary of ANZ Bank (with head office in Australia). ANZ has 12 outlets (branches and agencies) and some 80,000 customers.
- Bank South Pacific Limited (BSP), which is the only locally-owned bank and is the largest bank in PNG by a considerable margin (it claims to be responsible for 90% of all payments in PNG). BSP currently has 76 outlets and some 500,000 customers. It is targeting to increase the number of customers to 1.2 million over the next three years via its "BSP Rural" project to reach rural clients with basic savings services at reduced fees and with biometric identification.
- Maybank PNG Limited, which is a subsidiary of Maybank of Malaysia and has only two branches, namely its head office in Port Moresby and one other branch.
- Westpac Bank PNG Limited, which is a locally-incorporated subsidiary of Westpac Bank (with head office in Australia). Westpac has 15 branches and some 55,000 customers.

The commercial banking sector in PNG is well-established and of long standing (the first bank opened in 1910). However, the penetration of the banks into the population is very low; in 2008 the total number of accounts held at these institutions was estimated to equate to approximately seven percent of the total population. Nevertheless, this probably also equates to a high percentage of the 'formal' economy (comprising larger organisations and their employees). The geographical penetration of the banks is also very shallow and is confined to the major population centres.

The banks offer a wide range of modern services and products, including debit and credit cards, EFTPOS, Internet banking and electronic crediting of salaries. Their use has grown markedly in recent years and is continuing to grow. The services available are generally comparable to those offered in the more advanced economies in the region, but with one major difference, namely that there are no interbank electronic payment instruments such as direct credits and debits.

Each licensed bank operates two accounts at BPNG:

1. The Exchange Settlement Account (ESA), which is used for:
 - a. Daily settlement of net positions arising from the operations of the Port Moresby Clearing House;

- b. Purchase of securities;
 - c. Receipt of maturity payments on securities;
 - d. Interbank payments;
 - e. Purchase and redemption of Kina (PGK) notes and coins;
 - f. The Kina leg of foreign exchange transactions.
2. The Cash Reserve Requirements (CRR) account. The reserve requirement is currently 3%.

A Clearing House operates several times daily at BPNG for domestic paper instruments (cheque and warrants). All five banks (the four commercial banks plus BPNG) are members of the Clearing House. The operation of the Clearing House is entirely manual and is carried out in accordance with an agreement known as the Record of Arrangements Between Banks (RABB). There are also local clearing arrangements in some centres remote from Port Moresby (called Local Interbank Exchanges), under which cheques are cleared between the commercial banks without being sent to Port Moresby or involving BPNG.

2.1.2 Non-Bank Financial Sector

This sector comprises a range of institutions of which two groups are of particular relevance to the NPS, namely (i) two microfinance companies and (ii) the 21 Savings and Loans (S&L) Societies. In addition the sector includes nine finance companies, fourteen superannuation funds and eight life insurance companies.

Both the microfinance companies and the S&L Societies are experiencing strong growth, particularly in geographical areas outside the main urban centres. Their total customer base probably already exceeds that of the commercial banks. In addition they operate a larger number of 'points of presence' in more locations than the banks. The deposit base of these institutions is also growing rapidly, indicating that they are succeeding in mopping up cash in appreciable volumes from their customers/ members.

2.1.3 Multi-Tier System

In effect PNG is therefore served by a 'multi-tier' financial system:

1. The top tier of individuals and organisations is served primarily by the banks, but also to some extent by microfinance companies and S&L Societies, in the NCD and other main population centres. It has access to a good variety of payment services and instruments, but comprises a very small percentage of the total population, covering mainly larger organisations and their employees.
2. The middle tier is served by the non-bank financial institutions, primarily microfinance and Savings and Loans organisations. Its geographical coverage is more extensive than that of the top tier and lies mainly outside the main centres. In addition the number of people and companies served by this tier is larger than the top tier's, and is also growing rapidly.
3. The bottom tier covers probably the great majority of the population, who do not have access to any financial services and rely, where they use any payment instruments at all, entirely on cash. BPNG recognises that a major challenge is

“financial inclusion – how to get the un-banked portion of our population into the formal financial system²”.

2.2 Payment Instruments and Circuits

2.2.1 Cash

The PNG National Payments System is characterised by the dominance of cash as a payment instrument. This is especially true outside Port Moresby and the other main centres, where there are very few bank branches or other financial services and facilities.

There is an increasing recognition among all NPS stakeholders of the inherent inefficiency and insecurity of relying on cash, with a high incidence in many areas of theft and violence aimed against both individuals and institutions.

2.2.2 Paper Instruments

2.2.2.1 Cheques

Other than cash, the main payment instrument used throughout the country is cheques, which are used for a variety of payment purposes. Most government payments are made by cheque, as are payments outside those urban centres where EFTPOS services are available.

There is a generally high level of cheque fraud, as a result of which warrants tend to be used for high-value payments (see below, 2.2.2.2). Because of this, together with long clearing times and the general inefficiency and high level of manual operations entailed in processing cheques, there is a widespread desire in the banking and financial community to reduce the use of cheques and to accelerate the introduction of more efficient, safe and convenient electronic instruments. The Chief Secretary to the Government has also gone on record as being keen to move from cheques to electronic instruments for the same reasons.

Standardisation and Automation

At present cheque formats (and account numbering) are not standardised between the commercial banks, although all banks use MICR encoding on their cheques. The degree of cheque automation varies between banks; electronic cheque readers can be found in some bank branches, but not all, and generally for back-office functions, not at teller positions. At present any automation of cheque processing is confined to intrabank usage (cheques paid between customers of the same bank) because there is no electronic interbank system.

Usage

Despite increased economic activity in PNG, it appears that the level of cheque usage has, if anything, declined in the last few years. This has been attributed to two main factors: first, an increasing move towards payment of salaries directly into employees' bank accounts by both government and private sector employers; and,

² Speech by Governor Kamit at 2008 Waigani Seminar, UPNG, August 2008 – see <http://www.bankpng.gov.pg/speeches-mainmenu-95.html>

second, the increasing availability of EFTPOS terminals for retail purchases, as well as ATMs, in the large urban centres.

Further information on cheque usage, including statistics, can be found in section 2.3 (Clearing and Settlement).

2.2.2.2 Warrants

A warrant is a payment order drawn directly on a bank (including BPNG), and is therefore analogous to a Bank or Manager's Cheque. Warrants are cleared through the Port Moresby Clearing House along with cheques. Because they are issued by banks themselves, warrants are cleared faster than cheques and are thus often preferred, particularly for large payments by the GPNG. Although they are less prone to fraud than cheques, there have nevertheless been instances of fraudulent use of warrants.

2.2.3 Bulk Payments

The commercial banks all offer a service for bulk payment of salaries into employees' bank accounts. This is used for all Government salary payments and also by many commercial organisations. GPNG makes some 75,000 salary payments per fortnight via bulk payments.

Under this service, the employer creates a schedule for each bank of its employees with accounts at that bank, containing account details and amount to be credited to each employee's account. The schedules are physically delivered on computer-readable medium (CD-ROM or flash memory device) to the banks, each accompanied by a cheque for the total amount of money payable. The banks then credit employees' accounts in accordance with the schedules.

This facility has significantly reduced the usage of cheques since it was introduced, but it is not entirely satisfactory because, first, it involves a small element of physical risk (cheques are hand-delivered to the banks, and it is also believed that the discs containing salary schedules are not always encrypted); and second, it still involves a significant amount of manual processing, and complex processes, within the banks.

2.2.4 Cards

2.2.4.1 ATMs

Each commercial bank (apart from Maybank) has its own network of ATMs. These are primarily used for dispensing cash, although further uses are being considered by one or two banks (for example, payment of utility bills). The number of installed ATMs is steadily increasing.

ATMs are generally connected by circuits leased from Telikom (the government-owned operator of the fixed-line network), with wireless back-up from a private company in some cases.

There is no interbank electronic switch for either ATMs or EFTPOS, although cards can be used in any ATM. Authorisation and clearing of ATM transactions on accounts held at a bank different from the ATM owner are carried out via bilateral leased telecommunications links between the banks. International cards are accepted at all ATMs.

The cut-off time for daily ATM business is 8.00 p.m., following which bilateral positions between the banks are calculated. Settlement is made the next business day via warrant.

2.2.4.2 EFTPOS

EFTPOS is widely used in the NCD and other main centres. It has been well-accepted and its usage is increasing rapidly. It is, of course, highly dependent on the availability of reliable telecommunications circuits, which acts as probably the main inhibiting factor in the spread of EFTPOS throughout the country.

All three banks have entered into bilateral agreements under which it is possible to use a card issued by one bank on an EFTPOS terminal owned by the other bank. Each bank operates its own EFTPOS network, however, and there is no interbank switching capability, so that every terminal is branded according to the bank which supplied it. Terminals are supplied to merchants free of charge by the banks.

Most merchant connections are via Telikom dial-up lines. Leased lines are used by larger merchants, some of whom also have wireless back-up connections.

Interoperability of EFTPOS terminals is achieved through bilateral leased data communications circuits between the banks' core banking systems. Store-and-forward is used to hold transactions in case a bank's system is unavailable.

As with ATMs, the cut-off time for a day's transactions is 8.00 p.m., after which the bilateral positions are calculated and settlement is made on the next business day via warrants.

Historically merchants had to install EFTPOS terminals from each bank with which they had an agreement, because there was no EFTPOS interchange between banks. This has been resolved with the bilateral agreements mentioned above. Nevertheless, and mainly because of the perceived unreliability of EFTPOS, many merchants have continued with terminals from all three banks, to ensure flexibility in case of lack of availability of any one bank's EFTPOS service.

2.2.4.3 Credit Cards

Westpac have introduced an American Express branded credit card.

ANZ issues Visa cards in Kina with a maximum credit limit of PGK 20,000.

All ATMs and EFTPOS systems accept Visa and Amex credit cards.

2.2.5 Payment of Utility Bills

ANZ, BSP and Westpac each offer a co-ordinated service called BillPay whereby customers can pay bills from participating companies. Each BillPay payment is initiated by the customer via their bank's telephone or Internet banking service. To make a payment, the participating company is selected and the customer inputs the amount to be paid and the reference (e.g. invoice number).

Participating companies currently include a number of utility, ICT and entertainment providers and must be approved and registered by each of the banks offering the service. All payments are intrabank, as there is no automated interbank payment service at present. It should be noted that this is not a direct debit facility; all payments are initiated by customers, not participating companies.

2.2.6 Internet Banking

ANZ, BSP and Westpac all offer Internet banking facilities to their customers. There is no interconnection between banks, so Internet banking is confined to intrabank operations.

2.2.7 Salim Moni Kwik

Salim Moni Kwik (SMK) is a fax-based domestic remittance service (in Kina) offered by Post PNG at 89 locations around PNG, which makes SMK one of the most widely-available domestic payment services in the country. SMK is widely used, with a strong growth rate; some 500,000 transactions were made in 2009.

Using SMK, the sender pays cash at a Post PNG outlet and the order is sent by fax to another outlet, where the cash can be collected by the beneficiary on presentation of suitable identification (or a form signed by another person identifying them as the named beneficiary).

2.2.8 Mobile Payments

The use of mobile telephones to access payment services is at the very early stage of development in PNG. The first such service was BSP's *SMS Banking* which was introduced at the beginning of 2010 and which enables customers to make payments to other BSP customers using their mobile telephones. Currently at least two other services are in trial, with more expected in the future³.

2.3 Clearing and Settlement

2.3.1 Clearing of Paper Instruments

All commercial banks, as well as BPNG, are signatories to the Record of Arrangements Between Banks (RABB). This agreement contains the rules and procedures for handling paper instruments (cheques and warrants). These include the operational arrangements for the Port Moresby Clearing House which is operated by BPNG. In addition the RABB covers interbank arrangements for exchange and clearing of cheques in centres outside Port Moresby.

2.3.1.1 Port Moresby Clearing House

The purpose of the Clearing House is to clear cheques and warrants (see 2.2.2.1 and 2.2.2.2). During a Clearing House session all five participants exchange the cheques and warrants which have been deposited with them. There are three daily clearings, or exchanges, at the Clearing House on Monday through Thursday each week, and four on Fridays. Settlement follows the last exchange of each day. BPNG has an electronic system called Clearing which is used to record information on clearing sessions, but does not calculate net positions.

³ For further information, see the Governor's speech to a Mobile Money workshop held at BPNG on 10 August 2010 (http://www.bankpng.gov.pg/images/stories/sppeches/2010/Govenors_Speech-Mobile_Money_Banking.pdf)

The Clearing House is not used to settle all obligations between participants. For example certain transactions such as the sale or redemption of currency by BPNG are settled directly on the banks' Exchange Settlement Accounts (ESA) held at BPNG. Similarly interbank clearing of card-based transactions such as EFTPOS is carried out through bilateral arrangements between the banks as described below.

All transfers within any individual commercial bank remain internal to that bank and are not subject to clearing and settlement through the Clearing House.

2.3.1.2 Outside Port Moresby

In several centres outside the NCD, the commercial banks (with the exception of Maybank, which has limited retail banking representation) operate a form of clearing house (called Local InterBank Exchange in the RABB) in which they exchange cheques and warrants as in Port Moresby. Cheques drawn on the local branch of each bank are cleared immediately, while cheques drawn on other branches are generally notified to the applicable branch of the paying bank through the bank's internal IT network for clearance there. Cheques drawn on BPNG are sent for clearing through the Port Moresby Clearing House.

All cheques are physically sent to Port Moresby, where they are stored by the banks for the statutory seven-year period.

2.3.1.3 Large Value (Special) Clearing

The RABB also allows for special clearing of urgent or large value items. This is carried out by physically carrying the instrument to the paying bank branch and presenting it for immediate clearance. It generally attracts a high clearance fee to the customer. Special clearing can take place at any location, not just in Port Moresby.

2.3.1.4 Clearing Times

Under the present arrangements a minimum of four working days is allowed to clear cheques through the interbank cheque clearing system within the same centre as the paying bank branch. For cheques exchanged in a different centre from that of the paying bank branch, a minimum of nine working days (i.e. effectively at least two weeks and in practice often three weeks or longer) is allowed.

2.3.1.5 Statistics

Port Moresby Clearing House

The following table shows volumes and values of cheque clearances in Port Moresby for 2009.

Table 1 - Volume and Value of Cleared Cheques (2009)

Source	Volumes			Value
	Highest Month	Lowest Month	Full Year	Average per Cheque
GPNG	29,095	10,278	274,374	PGK17,813

Commercial Banks	9,825	6,411	91,526	PGK71,443
BPNG Staff	3,760	2,545	34,437	PGK653
BPNG General Ledger	758	508	6,996	PGK491,184
Total for 2009	20,364	40,261	407,333	--

Source: BPNG, 2010

2.3.2 Clearing of Other Instruments

2.3.2.1 Cards

At present there is no national interbank card switch, hence, as described in 2.2.3, interbank ATM and EFTPOS transactions are cleared through calculation of net positions on a bilateral basis. Clearing takes place after 8.00 p.m. daily, and banks issue warrants to cover their net positions. The warrants are then cleared the following day through the Port Moresby Clearing House.

Credit card transactions are cleared through their respective international clearing circuits.

2.3.2.2 Others

All other payment instruments (SMK, Internet banking, remittances) are single-institution only and are cleared within their respective institutions.

2.3.3 Settlement

2.3.3.1 Clearing House Positions

The daily net interbank positions arising from the operation of the Port Moresby Clearing House are settled by delivery to BPNG of paper Exchange Settlement Debits drawn on the banks' Exchange Settlement Accounts with BPNG. The cut-off time for delivery of these debits is 4.45 p.m. Monday to Thursday and 4.30 p.m. on Friday.

If a bank has insufficient funds in its ESA to settle its Clearing House position, it can cover its position by borrowing from another bank via their respective ESAs.

BPNG will permit ESAs to go into overdraft but at a penal interest rate.

2.3.3.2 Money Market

The interbank money market operates on the basis of credit limits and exposure limits that are set by banks between themselves. Money market transactions are settled through the ESA.

2.4 Fixed Income Securities

2.4.1 Introduction

At present both GPNG and BPNG issue fixed income instruments for the management of fiscal and monetary policy, respectively, as follows:

GPNG: Treasury Bills (1-12 months) and Inscribed Stock (up to 20 years).

BPNG: Central Bank Bills (up to 12 months) and Repurchase agreements (for small adjustments of monetary policy).

2.4.2 BPNG Securities

Implementation of monetary policy is carried out by the Money Markets Operations Committee (MMOC), whose membership is drawn from the Financial Markets, Economics and Research Departments and which is chaired by the Deputy Governor responsible for Policy & Regulation. This committee meets on Tuesdays, decides on the level of debt needed and agrees on the issue of Central Bank Bills. This is then implemented in the following day's auction.

For monetary policy management, BPNG deals at the shorter end of the maturity structure. Central Bank Bills (CBBs), generally maturing in either 28, 63 or 91 days, are sold at a discount and redeemed at par on maturity. Bids are received from licensed financial institutions which are Registered Bidders, and which deliver their bids to BPNG by the deadline of 11.00 a.m. on Wednesday.

BPNG also uses repurchase agreements (repos) for adjustments for weekly liquidity management with the commercial banks.

2.4.2.1 Primary Market

As CBBs are a monetary management instrument, bidding is restricted to those financial institutions which can transmit monetary policy, namely the Commercial Banks and other deposit-taking institutions licensed under the Banks and Financial Institutions Act 2000, or under the Savings and Loans Act 1995. These are currently the four commercial banks and 12 Registered Bidders (Savings and Loans societies and finance companies).

Bids are received on paper and are manually entered into the Registry and Money Market System (RMS – see 2.4.4) by BPNG Financial Markets staff.

Central Bank Bills

CBBs are generally issued by BPNG in a weekly auction. They have the following characteristics:

- CBBs are discount instruments where the bidder states the yield;
- Minimum lot size is PGK2,000,000.00 and then in PGK100,000.00 increments;
- No fees are charged on CBBs sold at auction;
- No bid may be withdrawn or amended after it has been submitted;
- Bids not in compliance with the terms and conditions are liable to rejection;
- The Bank of Papua New Guinea reserves the right to reject any bid or part thereof.

The auction closes at 11.00 a.m. and allocation is made a short time after the close. Where insufficient funds have been advanced by a participant, or their ESA holds insufficient funds, they will not receive their allocation.

Payment for the allocation is at 12.00 midday on T+2. Commercial banks have their ESAs debited at that time, while other bidders are required to supply cheques when lodging their bids. Any refunds due to a bidder not receiving his full allocation are made by cheque unless arrangements have been made to credit a bank account.

Bills will not be allotted if funds are not received by the designated deadline.

Tap Issues

In order to encourage participation by small investors, certain CBBs are issued via tap issues which have no closing date. Purchases are generally made in person at BPNG's head office and paid for by cheque. A tap issue is made for a set amount and is closed only when it is fully subscribed. Each individual allocation is made on the day of purchase.

Redemption

The Registry closes seven days before a CBB matures, and redemption payments are made the business day prior to maturity. Payment is made into the participant's ESA or, in the case of non ESA holders, by BPNG cheque.

Rollover to new issues is supported where, rather than paying redemption, BPNG will issue new securities to the redemption value.

Tax on redemption payments is calculated, deducted from the payments to owners and transferred to the GPNG's funding account (the Waigani Public Account or WPA). A schedule of tax payments made is sent to the Internal Revenue Commission (IRC) at the end of each month.

2.4.2.2 Secondary Market

Trades on the secondary market are finalised by both parties to a trade completing a Transfer and Acceptance form (T&A Form). This is passed to the Registry at BPNG, which updates the stock ledger.

In the secondary market, anyone who wants to buy CBBs should be able to do so. Only at the primary auction is participation restricted to the 5 banks and 12 authorised (licensed) financial institutions which constitute the wholesale market.

The PNG securities market is currently shallow, with only two licensed dealers and very little trading activity.

2.4.2.3 Use of Securities for Collateral

BPNG currently lends to banks on the basis of pledges. Repos are not used for collateral.

2.4.3 GPNG Securities

The Government's objective is to minimise the cost of debt consistent with its tolerance for financial risk. To support this objective the Government has three major strategies:

- To reduce debt to sustainable levels;
- To reduce financial risk; and
- To develop the Inscribed Stock, Bill and Loan markets.

In the 2008 budget the Department of Treasury noted that the development of sophisticated primary and secondary markets for Inscribed Stock, Bills and Loans was part of its longer term strategy while recognising the legal and regulatory issues that would need to be addressed. These longer-term strategies involve not only investors and financial institutions, but also the judiciary, the legal and accounting profession, regulators, utility providers, industry codes of conduct and qualifications. Such improvements are complex and are expected to take a considerable time to implement fully.

There are two Government debt instruments:

1. **Treasury Bills** – 28, 63, 91, 182 and 364 days.

T-Bills are bearer instruments and on redemption payment is made to the current holder. To reduce financial and interest rate risks, it has been agreed that the Government would move towards issuing only longer-dated securities (182 and 364 days), while the Central Bank issues shorter-dated securities for monetary policy management.

2. **Inscribed Stock** – long term up to 20 years.

The record of ownership is held in the computerised Stock Ledger, but the owner can request a certificate showing evidence of title. The lack of a certificate does not inhibit the owner from disposing of the stock.

These instruments are issued by the Government of PNG through the Finance Evaluation Division (FED) of the Department of Finance. BPNG is the agent for issuance of Government debt instruments.

2.4.3.1 Primary Market

Government securities are issued using the same process as for BPNG securities (CBBs). Bids are accepted from the four commercial banks and 49 Registered Bidders.

Treasury Bills are discount instruments repayable at the face value on maturity. Offer is made by the purchaser by specifying the yield rather than the purchase price. BPNG's system then calculates the purchase price. There is no restriction on the purchase of T-Bills. The minimum amount to be bid for is PGK100,000.

Inscribed Stock issued cannot be held by more than four persons, and can be owned by individuals, Trusts or other entities. Coupons are paid every six months.

2.4.3.2 Secondary Market

While there is the ability for owners of Inscribed Stock to transfer ownership, there is no active secondary market. The Department of Treasury has been working over recent years to implement a stable primary market and is not planning to encourage a secondary market at this stage. There is also no effective repo market.

The Department does, however, remain in close contact with both the participants and BPNG.

2.4.4 Registry

All securities, both BPNG and GPNG, are held in dematerialised form in the Registry and Money Market System (RMS), which was developed for BPNG in 2003 and has been substantially upgraded in the last year or so. RMS is used to conduct the primary auction of all securities, as well as providing a full range of registry and depository functions. Although securities are dematerialised, RMS also has the ability to print certificates. As previously noted, transfer of ownership resulting from secondary market trades is achieved by completing the Transfer and Acceptance Form (T&A Form), the details from which are entered into RMS.

2.5 Equities

Equities are listed and traded on the Port Moresby Stock Exchange (POMSoX) which is licensed under the Securities Act 1997. Currently two companies are licensed as stockbrokers and secondary market securities dealers. POMSoX operates a daily trading session based on an automated system called the Port Moresby Stock Exchange Electronic Trading System (PETS) which was licensed from the Australian Stock Exchange (ASX). Settlement is carried out manually.

The market regulator of the Stock Exchange is the PNG Securities Commission.

GPNG and BPNG fixed income securities are not currently traded on POMSoX.

2.6 Non-Financial Sector Players

This section briefly considers some of the major users of payment systems and services in PNG.

2.6.1 Government

As in most countries, the government is the biggest single user of the NPS, both as a creator of outgoing payments and as collector of revenue receipts. As shown in table 1 under 2.3.1.5, GPNG is easily the biggest originator of payments handled by the Port Moresby Clearing House, with almost 70% of the total⁴.

2.6.1.1 Payments

Cheques

Each GPNG Department has a drawing account at BPNG from which it makes payments (generally by cheque) for salaries and goods and services. These accounts are taken into overdraft as cheques are cleared at BPNG during the day. Through its Cheque Matching Process (CMP), BPNG records cleared cheques and reconciles them with records (“Daily Summaries”) of issued cheques which are forwarded to BPNG by the Departments. Each cheque is vetted by BPNG Banking Operations staff,

⁴ Nearly all GPNG payments are interbank, i.e. payments from accounts at BPNG to commercial banks, while many payments in the private sector are handled within the bank concerned (intrabank) and do not go through the Clearing House. Intrabank payments have been estimated at something over 60% of the total number of paper instruments handled daily in the NCD.

and suspicious cheques are held back from being cleared through the drawing accounts while they are queried with the drawing Department.

The CMP produces a daily reconciliation report by issuing Department, which is sent to the Department of Finance (DoF), along with any anomalies (outstanding, suspicious or forged cheques). On the basis of the reconciliation report, the Department of Finance instructs BPNG to transfer funds from the Waigani Public Account (WPA)⁵ to each Department’s drawing account to restore it to a zero balance at end of day. In the case where there are insufficient funds in the WPA to cover cheques that have been received, the clearing of all cheques is suspended while DoF is notified and requested to fund the WPA. This is generally by either making an issue of short-term Treasury Bills or BPNG making a Temporary Advance Facility (TAF) to cover the shortfall. Either expedient naturally requires some time.

The general process is depicted in figure 1 below.

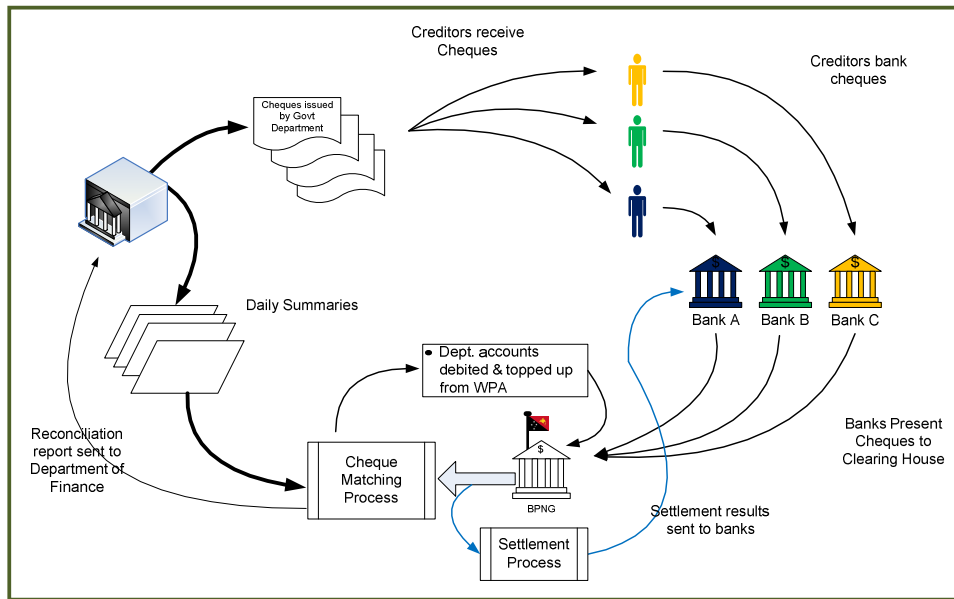


Figure 1 - Government Cheque Issuing Process

Currently all government cheques are printed using the PNG Government Accounting System (PGAS) which is a distributed computer-based accounting system run at approximately 120 government locations throughout the country. PGAS and its associated systems are being replaced under the Integrated Financial Management System (IFMS) project which is currently being implemented. When IFMS is fully operational, all payments which are currently made through distributed PGAS installations will be centralised in IFMS at DoF’s head office in Port Moresby. Further information on IFMS is given in 5.6.1.

⁵ This is the GPNG’s consolidated account at BPNG.

The DoF also uses a facility which it calls 'EFT' for bulk payments to major suppliers such as Air Niugini. This works in the same way as the process for bulk payroll payments (see 2.2.3).

High Value Payments

For high value payments (generally of the order of millions of Kina), Departments use a Payment Advice (PA), which is an order to BPNG to pay funds to a specified account. The PA is sent by fax to BPNG's Banking Department, which raises a warrant and delivers it to the beneficiary bank. At the same time the funds are transferred directly into the beneficiary bank's ESA. BPNG receives two or three PAs per day.

District Treasury Offices

There are District Treasury Offices in all 89 Districts in PNG to facilitate payments (typically issuing cheques to local contractors) and non-tax revenue collection. This is a challenge in many locations where telecommunications and power supply are unreliable or in some cases non-existent.

2.6.1.2 Revenue Receipts

All Government revenues are collected into the WPA.

Tax receipts are handled by the Internal Revenue Commission (IRC), while the Customs Service manages its own receipts and accounting. All other GPNG receipts are made at offices of the Department of Finance, currently by cash or cheque. In future DoF will also accept payment by EFTPOS or credit card. DoF will also be capable of receiving payments via the ATS once it is in operation,, subject to suitable arrangements between BPNG and the Department of Finance.

Tax

Tax payments are currently all made by cheque, all of which are received and processed at IRC head office in Port Moresby. The average daily number of payments handled is 300. Once processed, tax payments are deposited at BPNG for crediting to the WPA.

Tax refunds are paid by cheque, which may be collected at IRC head office or alternatively sent to payees by registered mail.

The IRC is currently engaged in a Revenue Administration System Redevelopment Project which will include a new integrated information system for processing tax revenues.

Customs

Customs receipts are collected by the Customs Service at its posts throughout the country and deposited at local branches of BSP. BSP consolidates them and forwards the funds to the WPA using warrants.

Customs operates throughout PNG and uses the UNCTAD-developed ASYCUDA system (Automated System for Customs Data) via its own ICT network. Under ASYCUDA, Customs brokers submit import entry documentation electronically and the system calculates the duty payable. Payment of duty is currently by cash or

cheque. Goods are cleared immediately on payment and, if a cheque is subsequently dishonoured, the broker is charged a late payment fee.

Customs would like to move away from cheques to an electronic payments environment as soon as possible. In addition many importers have expressed a desire for faster and more automated management of the whole import process. A suggested scheme for a fully-automated process for payment of import duties using the ATS is described in 5.6.2.

Non-Tax Receipts

As noted above, all other receipts of government revenue are collected by the Department of Finance, usually in cash or by cheque. They are currently accounted for in PGAS.

2.6.2 Others

Retail Companies - EFTPOS

Retail companies are increasingly installing EFTPOS terminals in urban areas, and the usage of EFTPOS is exhibiting steady growth, mainly at the expense of cheques and, to a lesser extent, cash. In general retailers prefer electronic payment instruments, particularly EFTPOS, because:

- They get immediate value from the bank for each purchase;
- Without cash their operations are less vulnerable to robbery;
- Cheques and cash are costly, as well as risky, to handle.

Trade Stores

Trade Stores are generally found in rural, often remote, areas. They typically provide the only source of goods and services for the local population. In many cases there is no telecommunications capability, and sometimes not even an electric power supply. Trade stores therefore operate predominantly on cash as the instrument of payment.

In some cases the local trade store will act as an encashment agent, in that smallholders who have been paid by cheque for their crops will cash the cheques at their local trade store. For this the trade store charges a fee, which can be quite high, but may be preferable to (and safer than) the cost of taking public transport (PMV) to the nearest town where there is a bank in order to cash the cheque.

It is believed that an appreciable percentage of trade store owners would welcome the introduction of reliable electronic payment circuits and instruments. These might include, not only EFTPOS, but also other, more innovative, payment mechanisms, for example based on mobile telephone technology such as are being introduced in many other countries.

2.7 ICT Environment

This section describes in broad terms the present ICT environment which is relevant to this RFP. Proposers should take this into account when preparing their proposals.

2.7.1 BPNG

The current ICT environment at BPNG is based on a Local Area Network (LAN). All staff members have PC workstations running Microsoft Windows and Office software.

2.7.1.1 Network

BPNG's Information Technology Department is currently carrying out an audit of the LAN. This is expected to result in a significant upgrade which is planned to be completed by the end of 2010. An up-to-date network diagram will be made available to the successful proposer when the upgrade has been completed.

2.7.1.2 Servers

1. The end-user environment is hosted on servers running under the Microsoft Windows Server operating system.
2. Most applications are run on IBM RISC 6000 servers running the AIX operating system. Some newer applications are run on IBM Intel blade servers running under Red Hat Linux.
3. BPNG's website is hosted externally and managed by the ISP Datec. There is no internal web server.

2.7.1.3 Data Storage

An IBM HS21 Storage Area Network (SAN) is in use for the data warehouse system (see below). Otherwise data storage is provided by rack-mounted servers.

2.7.1.4 Applications

BPNG currently uses Oracle version 10g as its database management system for all applications.

The following applications are in use:

1. The Oracle Financials version 11i package for finance and accounting.
2. Comprehensive Reserves Management System (CRMS), which uses a software package supplied by Misys and which has recently gone live.
3. Registry and Money Market System (RMS) which was developed for BPNG by an external supplier (see 2.4.4).
4. Alesco Human Resources/payroll package.
5. Clearing (registers information on cheques cleared through the Port Moresby Clearing House).
6. Balance of Payments management (BOP).

In addition BPNG is in process of implementing a comprehensive data warehouse system, based on Cognos software supplied by IBM. This is being developed in two stages:

1. Stage 1 (currently under development): Strategic reporting and self-service reporting across BPNG, using all data sources within the Bank.

2. Stage 2 will extend the data warehouse to a full Business Intelligence capability.

2.7.1.5 Facilities

All equipment is installed in a server room at BPNG's head office in Port Moresby.

There is currently no back-up (Disaster Recovery) site, but BPNG is planning to establish one in time to be used for the systems which are the subject of this RFP.

2.7.2 Commercial Banks

All four commercial banks currently use the ICBS software package as their in-house core banking system.

The banks also operate their own data networks. In some cases some of the more remote agencies are not yet attached to their bank's network.

3. Scope of this Procurement

This section briefly summarises the required products and services that are the subject of this procurement.

The required solution should be proposed on a full turnkey, fixed-price, basis and cover all elements including:

1. Application software package;
2. All hardware and other software (e.g. system software, RDBMS, etc.) necessary to run the ATS at all project locations, which must be compatible with BPNG's existing ICT infrastructure described in 2.7;
Proposers will not be required to supply these items, which BPNG will purchase itself in consultation with the successful proposer;
3. A high level of consulting services to assist BPNG with the business aspects of introducing the ATS. These services will include aspects such as developing operating rules and procedures and pricing policy for system usage, and the successful proposer will be required to provide draft versions of these documents;
4. Any required customisation and integration of the application software, including requirements analysis, specification, development of special software modules and implementation;
5. Full implementation services including installation, testing, documentation, training, commissioning and handover, and integration with the existing ICT environments as described in 2.7;
6. Ongoing (post-acceptance) support.

3.1 Automated Transfer System

The ATS will provide a comprehensive electronic interbank payment mechanism. Using the ATS, financial institutions will be able to send a wide variety of payment instructions to each other and to BPNG.

3.1.1 Payments

The ATS will provide both Real Time Gross Settlement (RTGS) and Automated Clearing House (ACH) capabilities for the clearing and settlement, within one integrated system, of all interbank electronic payments.

BPNG expects that the ATS will be based on a Real Time Gross Settlement software package, which will handle the settlement of:

1. Transactions involving purchase and sale of securities (primary and secondary) in the GSS in accordance with the principles of DvP and STP;
2. High-value and/or high urgency bank-to-bank payments;
3. Net interbank positions from the ACH clearing element of the ATS;

4. Bilateral net interbank positions from ATM and EFTPOS transactions, and in future multilateral net positions from a national card switch (yet to be established);
5. The PGK leg of BPNG's foreign exchange transactions (via a linkage to CRMS);
6. (In future) equities transactions from POMSoX.

In addition to the RTGS capability, the ATS will also contain clearing functionality (ACH) to handle the processing of different retail (low value) payment streams. These will include:

1. Direct credit payment instructions initiated by customers of financial institutions;
2. Corporate-to-corporate payments which may include related detailed information such as invoice number, line details and so on;
3. Files of direct debit instructions;
4. Files of electronic cheque records (data and images);
5. Bulk payments of salaries; and
6. Other possible streams of high-volume low-priority payments.

The ATS will provide a single, unified system for the processing of all payment types, irrespective of their characteristics. It will carry out the functions that in some countries have been provided by different, discrete software systems (RTGS and ACH packages) which have had to be provided with interfaces to achieve what the ATS will achieve in one integrated system.

3.1.2 Participants

Other than BPNG, the direct participants in the ATS will be confined, at least initially, to institutions with ESAs at BPNG (i.e. the four commercial banks). Any new bank receiving a banking licence from BPNG in the future will also be required to become a participant in the system. There may also be a number of indirect participants which will access the ATS via the direct participants. These could potentially include Savings and Loans Societies, PNG Post and microfinance institutions. A decision on inclusion of indirect participants will be made during implementation of the ATS.

3.2 Government Securities System

BPNG intends to base the GSS on the existing RMS, which provides primary market auction, registry and maturity processing functions for BPNG and GPNG securities, and which will be closely-coupled with the RTGS function of the ATS to ensure that ownership of the securities involved is not transferred until payment has been made with finality, and *vice versa*.

There are currently no plans to introduce a secondary market trading platform.

3.3 *Integration and Linkages*

3.3.1 *ATS and GSS*

The components of the IPPS will be tightly integrated, both with each other and also with various external systems. Most importantly, the RTGS and ACH elements of the ATS will be fully integrated with each other and with the GSS component so as to provide the capability both for effecting settlement with finality of securities transactions and for supporting the provision of intraday liquidity to direct participants in the ATS. The IPPS will provide a true Delivery versus Payment capability for securities transactions.

3.3.2 *Linkages with External Systems*

Other linkages will be developed to:

1. BPNG's accounting system (Oracle Financials version 11i);
2. BPNG's Comprehensive Reserves Management System (CRMS);
3. BPNG's data warehouse;
4. The Department of Finance's Integrated Financial Management System (IFMS);
5. The Customs Service's ASYCUDA system;
6. The Internal Revenue Commission's SIGTAS system;
7. The Department of Treasury's debt management system (CS-DRMS);
8. In-house core banking systems operated by participants.

In future other systems will need to be linked to the IPPS. These are likely to include:

1. A national interbank card switch;
2. An interbank money market system;
3. A forex trading system;
4. The POMSoX equities trading system.

3.4 *Technical Environment*

3.4.1 *Security and Integrity*

The IPPS will be developed and implemented to the highest standards of security and will meet all participants' expectations of confidentiality, integrity, and availability.

Operational integrity will be supported through hosting the processing capability for the system at primary and alternate processing sites, with redundancy of key components and close integration between the two sites to ensure that the system operates to a level of performance and reliability commensurate with its critical role in the national economy of PNG.

3.4.2 Hardware and Associated Software

BPNG intends to procure the required hardware and associated components itself, according to the recommendations which will be agreed with the successful proposer. Proposals must therefore include the specification of all necessary items, as described in 4.13.

All items should be compatible with BPNG's existing ICT infrastructure as described in 2.7.1. BPNG's IT Department will agree with the successful proposer the final specification of all items and an installation timetable to match the agreed project plan. The successful proposer will be required to provide contractual assurances that the agreed total configuration (hardware, networking and software) will support the IPPS in processing expected workloads for at least three years after acceptance.

3.4.3 Communications

The secure transmission and receipt of messages is essential for all elements of the IPPS. The system will require the highest standards of availability, reliability and performance. Directly-connected participants in, and users of, the system will be BPNG, the four commercial banks, the DoF, the DoT, the IRC and the Customs Service.

BPNG and the commercial banks have decided to use SWIFT as the networking solution for the IPPS and proposals should take this into account as necessary.

3.5 Services

BPNG understands that the success of the IPPS project is particularly dependent on the provision of a comprehensive range of high-quality services from the successful proposer. Proposals must therefore contain full details of the services to be provided, as specified in section 7.

The services components of proposals will be given a substantial weighting in the overall proposal evaluation process and criteria.

4. Common System Requirements

As described earlier in this RFP, BPNG wishes to implement an integrated system comprising Automated Transfer System and Government Securities System components. These two, together with the linkages described later and other associated supporting systems, will be considered as one integrated payments processing system (IPPS). Each of these elements has its own specific functional requirements and these are described in sections 5 and 6 (section 6 describes the functional requirements for a Central Securities Depository which BPNG expects will be provided by the existing RMS. Proposers are asked to respond to Section 6 **for information only**). This section provides the detailed specifications that are common to the overall IPPS.

Proposals should consider all aspects of the system including:

1. The facilities and functionality provided to all system participants;
2. System performance levels;
3. Billing;
4. Operations, maintenance and support;
5. Development and enhancements;
6. Capacity, scalability and upgrades of the system.

4.1 Principles

All software components should be based on best international practice and be consistent with the following principles:

1. Have a high level of usability with a common “look and feel” achieved through a standard graphical user interface (GUI);
2. Comply with industry standard conventions and interfaces which allow the system to be interfaced easily with other systems, and/or expanded by either functional module or capacity;
3. Offer low cost and easily implemented technical connections for external participant sites on either a remote terminal or host-to-host basis for all system traffic;
4. Enable BPNG system operators easily to add, remove or suspend participants;
5. As appropriate, permit optimum use to be made of any equipment that is already installed in both BPNG and participant organisations;
6. Provide full audit trails for all activities within the system, including system accesses and messages sent and received;
7. Have high levels of trustworthiness with particular emphasis on data integrity and security, particularly preventing unauthorised access and assuring 100% data accuracy;
8. Have very high levels of service availability which will be assured through demonstration, rigorous testing and a robust Service Level Agreement;

9. Offer automation of daily processing with full exception and summary control reports for both BPNG and participants;
10. Provide comprehensive event and problem management tools;
11. Be configured such as to process the expected workload in terms of throughput capacity and response times, making due allowance for peaks in transaction volumes and general growth in transaction volumes.

4.2 Operational

As applicable, the system should:

1. Allow for easy customisation through on-screen parameters to accommodate new, changed or modified rules that will govern various functions e.g. create a new message type, create a new instrument type, etc.;
2. Allow authorised personnel to change the business process flow through the setting of parameters in process control tables;
3. Provide online access to and reporting of historical records – covering a period of at least five (5) years plus the current year – without compromising response times;
4. Provide online, context sensitive help for all user and operator functions;
5. Enable automation of daily processing including initiating links to directly interfaced systems with appropriate security procedures and exception and summary control reports;
6. Be operationally resilient, with high levels of local recovery supported by an appropriately configured back-up installation and a smooth cut-over between the primary and alternate sites, and back again to the primary site when service is recovered.

4.3 Integrity

The system should provide:

1. Financial integrity checks to ensure that ‘value in = value out’ at all times and that the ATS component can be reconciled to a zero net balance at any time;
2. Message processing integrity checks to ensure that the total nominal value of all instruments in all recorded portfolios is matched, and reconciles with the control totals for all issues registered;
3. Processing integrity checks to ensure that ‘number of financial items in = number of financial items out’ at all times and that each processing site can be reconciled to a ‘no missing items’ position at any time;
4. Consistent and regular reporting for financial processing, security logs, calculated settlement positions, gross and net settlement values, batch and file numbers processed etc. which can be reported both locally and centrally to prove system integrity and complete system-wide reconciliation;
5. Local record of all messages sent, pending and received each day;

6. Encryption of all data flows;
7. End-of-day audit and activity reporting;
8. Local recovery capabilities;
9. Security of messages with a high level of message authentication, data integrity, and confidentiality;
10. A very high level of availability and reliability;
11. Guarantee of no data loss either in transmission or after a failure.

System management functions must be fully integrated. For example, setting any parameter that may be applicable to all system components must be set only once. All system information moving between components must be transparent to system operations.

4.4 Transaction and File Processing Controls

Incoming transactions and files must be checked for at least the following:

1. That the type and format are correct;
2. That the source is authorised;
3. That the identification, date and, for files, control totals are correct;
4. That a message is not a duplicate;

Outgoing transactions and files must be checked at least as follows:

1. It must be assured that no transaction or file will be left undelivered;
2. If delivery is not possible, alerts must be available;
3. It must not be possible to deliver twice, except under recovery procedures when both parties are made aware of the possibility that the message may be a duplicate.

4.5 Validation Controls

Validation controls must include:

1. Validation of batches and individual payment instructions, of all types;
2. Validation of mandatory and optionally other fields within funds settlement instructions;
3. Authentication of message sender;
4. Confirmation of message traffic and validity to the sender;
5. Flexible and tailorable validation routines.

Proposals should describe validation options offered by their proposed solution and the extent to which these can be tailored by BPNG, and also discuss the processing overhead that validation controls may impose on the system in a high-volume environment.

4.6 Message Integrity and Accountability

The controls must include the following:

1. Each registration of change instruction or payment instruction, and files containing such instructions, must be uniquely identified with its physical source, user identification and date and time of entry into the system;
2. Each instruction must be executed according to the single or multiple levels of authorisation (two-eyes or four-eyes) prescribed by the administrator and/or the participants;
3. A message sequence numbering scheme and control procedure must be implemented to ensure there is no loss, duplication or unauthorised insertion of messages;
4. Non-repudiation is required for all participant messages;
5. Application level message acknowledgment is required as a mandatory component of all message handling;
6. Where an operator has the ability to make any change to any message (e.g. value messages or messages that contain instructions for making payments or transferring securities) or critical system parameters, the system must allow for multiple authorisations;
7. It must be possible for operational management automatically to trace any transaction from the point of entry into the system up to the delivery to the final destination with complete information about the time the message was received and delivered, and the processing which occurred at each step at each location handling the transaction/file. Information for this purpose must be kept on line for up to a number of days which can be defined by BPNG, after which time the data should be archived to permanent off-line storage;
8. It should be possible to suspend processing of elements of the system (for example selected payment queues or streams) in the course of the business day and resume operation without the loss or duplication of messages;
9. In the case of failure leading to unavailability of the primary site, the resumption of service at the alternate site should be completed within a maximum time of ten minutes with minimum user intervention.

4.7 System Operation

1. To minimise the opportunity for human error to cause service disruptions, operation of the software should be automated as far as possible, with controls to assure successful completion of each job as a condition for initiation of subsequent job sequences;
2. The software should offer a consistent graphical user interface (GUI) to enable BPNG to control its overall operation. This should provide a comprehensive range of user-definable parameters which should be fully described in proposals;

3. To assist in the execution of monetary policy, the system should be able to show on-line to BPNG short summaries of the overall liquidity situation of the system, both stand-alone and compared to previous situations (hours, days, and weeks);
4. All aspects of the system must be controlled via a single GUI;
5. Technical management requirements must be kept to a minimum. It is especially important that all error messages be simply displayed and easy for operational staff to understand and react to;
6. The system should require minimum (preferably no) intervention by IT technical staff for normal operations including start-up, daily operations and shut-down;
7. The system should provide a range of alarms and alerts with options for:
 - a. Different alert levels (e.g. critical, serious, information-only);
 - b. The nature of alarms available (e.g. flashing message at an operator workstation, audible warning, email message, SMS message to a mobile phone);
 - c. Recipients of alerts (e.g. operations staff in BPNG Payment Systems department, participant bank end-users, BPNG operations, BPNG accounting department, BPNG treasurers, etc.);
8. Certification measures will take place using the test environment that is to be established as part of this procurement. They should be carried out using a standard set of test messages that will be developed as part of the overall system implementation and should include:
 - a. Testing and certifying new software releases/upgrades prior to use;
 - b. Testing and certifying new system participants in respect to hardware, software, communications and procedures.

4.8 Enquiry and Reporting

The IPPS will provide comprehensive reporting and on-line enquiry facilities allowing all participants to make a broad range of requests for the purpose of monitoring their positions, tuning system functionality, managing intra-day liquidity, queue management of payment requests and so on.

4.8.1 Reports

Proposals **must** contain a full list of **all** standard enquiries and reports available in the proposed software package(s), for all types of users. They must also include a representative sample (listings and screen-shots) of enquiries and reports sufficient for BPNG to gain a good understanding of what is provided. These samples should demonstrate comprehensibility, usability and comprehensiveness of the information contained in enquiry screens and reports.

Proposals should contain details of: (i) how BPNG staff can tailor/customise standard reports if desired; (ii) proposed report-writing tools for the development of further

(non-standard or *ad hoc*) reports; and (iii) proposed training/knowledge transfer to ensure that BPNG staff are able to undertake future report development.

4.8.2 Dashboard

BPNG wishes to implement a consolidated display capability ('dashboard') to support system operations staff in managing the overall IPPS. This would use a large monitor positioned centrally in the operations area to provide BPNG staff with a view of the overall status of all critical and important elements of the system. Proposers should describe how their system supports this concept, with recommendations as to the data items that would be displayed.

4.9 Security

4.9.1 Monitoring and Measurement

1. All accesses to the system, transactions handled by the system and changes affecting access controls, system parameters, directories and similar control and integrity functions should be logged and reported to BPNG operators, and be accessible for authorised retrieval and analysis, on a daily basis. It must not be possible to alter in any way the contents of any audit log;
2. The following information must be provided:
 - a. Control totals for a day's processing in a location;
 - b. Management of all system users (from both BPNG and other participants) and their access privileges;
 - c. Invalid access attempts at workstations;
 - d. The number, frequency and source of invalid transactions and files;
 - e. Any unusual behaviour patterns by an authorised user, indicating increased risk and/or attempted fraud.

4.9.2 Access Controls

1. Access to all parts of the system must be restricted to authorised personnel or systems by means of strong system, device and user authentication. User authentication capabilities should include two-factor authentication, and proposals should contain recommendations as to all necessary hardware, software and services to achieve this;
2. The system should support a hierarchical user structure, such that at each participant (and also in BPNG's operational area) there can be a local administrator with certain additional rights (e.g. for password reset);
3. Separation of duties must be strictly enforceable for all sensitive programs and functions;
4. All accesses must be logged to include system or physical device identification, user identification and the time of each access in order to provide a clear audit trail for review in case of accidental or deliberate violation of security controls;

5. The system start-of-day procedures should include the initiation of directly interfaced systems and confirmation of the authenticity of each interfaced system;
6. Users should not be able to see menu options for those functions they are not authorised to use;
7. The system must enforce sound password management. That includes: enforcing the use of 'strong' passwords; forced expiry of passwords at parameter-defined intervals; disablement of accounts after a parameter-defined number of unsuccessful log-in attempts; and not permitting the re-use of a parameter-defined number of previously used passwords;
8. Application workstations must be logged off automatically if idle for more than a specified – but variable – period, to prevent access by unauthorised third parties if left unattended.

4.9.3 Fail-Safe Operation

1. The system must provide the highest level of availability. The system should therefore be configured such as to be able to recover from any single failure automatically, and with no interruption in service;
2. In any case, the system must be able to complete processing of all transactions for the day within a maximum of two hours after normal close of day.

4.10 Processing Requirements

BPNG requires the highest level of performance, availability and reliability from the system. The system will therefore be implemented to run at two sites.

A further copy of the system for test and training will also be run at the primary site.

In addition, BPNG will regularly copy all data to back-up media daily, weekly and monthly and store it at an off-site location.

4.10.1 Operational Resilience

All system elements must be designed and configured to provide a very high level of reliability, resilience and availability, as further described in 4.13. The system at the primary processing site should keep the system at the alternate site updated (and vice versa) so that, in the event of a failure at one site, the other site is able to continue processing with minimal manual intervention.

Proposers should address these requirements carefully, and make appropriate recommendations for achieving the highest level of performance and reliability. Proposals should contain a detailed specification of all proposed hardware, software and any other necessary components to achieve the required levels of reliability and switchover times. They should also include a discussion of worst-case scenarios requiring a complete switch-over from the primary to alternate site.

4.10.2 Test Environment

A test environment should be available at all times to allow for testing of planned system changes, or for participant interface testing. Proposers should describe how they will accomplish the following main tasks:

1. Management of changes involving hardware, system software and application software, covering all participants;
2. Operation of the above system components;
3. Testing of parameter-level changes made by the system operator.

It is expected that the initial system implementation will follow this process.

4.11 Operational Requirements

4.11.1 Daily Processing Cycle

BPNG will publish an annual schedule giving the daily processing cycle for the system. The timing and duration of different processing windows will be agreed between BPNG and participants.

The system operating hours will be flexible and capable of adjustment to cater for abnormal circumstances.

For certain classes of payments (queues) it must be possible to suspend daily operation and restart on another day while retaining the same value date.

4.11.2 Start/End of Day

With the exception of security provisions, any procedures related to the start/end of day activity should be handled automatically.

4.11.3 Performance Monitoring

The performance of all components of the system will be monitored on an ongoing basis, and relevant exception reports will be produced with suitable highlights whenever system performance falls outside accepted performance standards. Proposals should include details of proposers' recommendations covering at least the following:

1. A performance monitoring system, including an events monitor integrated with the dashboard described in 4.8.2, which depicts critical operational and security events including the operational status of all authorised users and attempts to access the system by unauthorised users;
2. Introduction of a reporting system which can be used to monitor the quality of the service and provide appropriate tailored information to all participants.

Proposers should describe how the different measures should be monitored and, where appropriate, also give an indication of the levels of performance they typically expect to achieve. The measures should include the following:

System Availability

The System Availability measure should capture the percentage of normal business hours in which each system component is delivering service to participants regardless of the source of any service disruption e.g. hardware, software, network, power, human error.

Message throughput

Message throughput should be monitored and reported against at least the following parameters:

1. The number and value of messages per day by payment type, stream (queue) and participant and in total;
2. The number and value of messages processed during the peak hour;
3. Average time in queue of messages by queue, by participant and in total per day.

Proposals should describe all available tools to collect and maintain statistics for both BPNG and participants.

4.11.4 Operational Rules and Procedures

Proposers will be expected to advise and assist BPNG in developing and implementing rules and procedures (for both BPNG and participants as applicable) for operation of the system. This must include provision of suitable sample documents which BPNG can adapt.

4.12 Billing Information

The system must include a flexible billing mechanism which will automatically calculate fees for each participant, and which should have the following functionality:

1. Enable fixed periodic charges (e.g. annual or monthly membership fees) to be levied;
2. Calculate usage fees based on message or instruction type;
3. Apply value modifiers by message during time bands during the day;
4. Apply value modifiers for different payment streams (queues);
5. Apply value modifiers for volumes of transactions;
6. Allow for different charges according to participant;
7. Apply charges directly, with no manual intervention other than authorising the transaction;
8. Automatically create invoices to be sent to all direct participants as well as those without settlement accounts at BPNG, such as indirect participants.

The billing and invoicing interval/cycle should be flexible and able to be set by BPNG.

Proposers should fully explain the options and capabilities of the charging and billing functionality, including the automatic generation of relevant payment messages. The successful proposer will be expected to advise and assist BPNG in developing and implementing a suitable pricing and billing policy.

4.13 Hardware, Software and Communications

The IPPS will run on dedicated hardware to be installed both in a primary site at BPNG's head office and in a yet-to-be-established alternate site, as follows:

1. The live system will be installed on servers at both sites. The equipment at each site should be sufficient to run the entire system should the other site become unavailable, but in normal operation BPNG expects that the systems at the two sites will be coupled in such a way that a failure of any single server (for example) will have no effect on the operation of the system. Proposals must contain recommendations as to how the two sites will be equipped and coupled to enable the highest level of availability.
2. Proposals should also contain details of how suitable failover procedures will be developed and tested to allow for situations of multiple failures or complete unavailability of one site.
3. A test and training system will be installed at the central site. This will be used as required for testing of changes to the software, training of staff, etc.

BPNG intends to procure the required hardware and associated components itself, according to the recommendations which will be agreed with the successful proposer. Proposals must therefore give full details of all recommended hardware, system software, middleware and any other products and equipment necessary to run the system. All items must be compatible with BPNG's existing ICT infrastructure as described in 2.7.1.

After contract signature, BPNG's IT Department will agree with the successful proposer the final specification of all items and an installation timetable to match the agreed project plan. The successful proposer will be required to provide contractual assurances that the agreed total configuration (hardware, networking and software) will support the system in processing expected workloads for at least three years after acceptance.

4.13.1 Hardware

Proposers must specify full details of all hardware elements recommended to operate their proposed solution. These should include details of any hardware that may need to be installed by participating organisations.

All components of the system will be required to operate without a need for upgrade for a period of at least three years from operational acceptance and the hardware should be sized accordingly. Hardware recommendations should include all related services and should cover (as applicable):

Servers

Proposals must specify in detail all recommended server components, together with any items necessary for connection to BPNG's existing ICT environment:

Application and data servers should be based on either IBM hardware running AIX or IBM or HP hardware running Red Hat Linux. If both options are available, they should both be included in the proposal.

Other servers (web, certificate, directory, etc. as necessary) should be based on IBM or HP hardware with recommendations as to operating system(s).

Data Storage

Proposals must specify in detail the recommended data storage capacity and equipment. This should be supported by sizing information on the capacity required to hold all copies of the system database(s) and any other supporting data, based on the current and forecast volumes given in this RFP. Proposals should allow for the last five plus the current year's data to be held in the on-line database and up to ten years' data on a secondary database. These requirements will be discussed in more detail with the successful proposer.

Workstations

BPNG expects that the system will use existing PCs as user application workstations. Proposers should specify both minimum and optimum configurations required but should not propose any workstation PCs.

Other Hardware

Proposals should include details of any other hardware required by their solution.

4.13.2 Software**Participant Software**

In addition to software required at BPNG, proposers must specify in detail all software products (required and optional) that may need to be installed by each participating organisation, including requirements for Straight Through Processing.

System Software and Middleware

In addition to server operating system(s), proposals should clearly specify in detail any other system software and middleware items that will be required to run the IPPS.

Database Software

Proposers must confirm that their proposed solution will run on BPNG's chosen RDBMS (Oracle version 10i), and specify the nature and number of Oracle licences that BPNG will need to order.

Proposers should provide a description of any special facilities of the database management software which are utilised by their application, for example automatic database replication to facilitate high availability.

Report Writer

Proposals should describe standard easy-to-use database report generation tools that can be used for the rapid development of reports to satisfy needs that might arise on an *ad hoc* basis.

4.13.3 Communications

Proposers should specify in detail all communications requirements for their solutions, covering both BPNG (both processing locations) and all participating organisations, including performance, security, reliability, backup capability, bandwidth and any other relevant considerations.

5. Specific Functional Requirements for the Automated Transfer System

The Automated Transfer System (ATS) will provide for the submission, processing and settlement of all inter-bank payments, both large and small. There will be no defined value limit (upper or lower) for payments accepted for processing.

5.1 Objectives

The objectives of the ATS are to:

1. Provide efficient and cost-effective clearing and settlement capabilities for all interbank payments, with the ability to handle significant future growth in volumes of payments;
2. Achieve real-time settlement of payments between its participants in the books of BPNG to deliver irrevocability and finality of payments;
3. Provide facilities to increase the efficiency of daily liquidity management by banks through the provision of real-time settlement account information reporting and monitoring;
4. Minimise payments system risk by managing liquidity on both an individual bank basis and system-wide;
5. Improve the tools for BPNG to implement monetary policy;
6. Integrate the clearance and settlement of GPNG and BPNG securities transactions to achieve Delivery versus Payment;
7. Achieve a reliable, safe, and integrated payments and settlement system to meet the needs of a growing economy, with the ability to be extended to process new payment instruments and support new payment systems as they may be developed.

As previously explained, BPNG wishes to procure a modern integrated solution which is capable of clearing and settling all types of electronic instruments in a conceptually single electronic system. The ATS should contain the ability to provide different processing modalities for high value/time critical payments (to be handled by the RTGS element) and low value/retail payments (to be processed using the ACH element), but these must be integrated in such a way as to provide a single coherent user interface. Proposers should therefore describe all types of payment instruments and arrangements that their proposed solution can handle.

The ATS will be closely-coupled with the GSS: (i) to ensure Delivery versus Payment (DvP) for transactions in Government and BPNG securities; and (ii) to support the process of intraday liquidity management in the ATS.

5.2 ACH Element – Clearing Functionality

The ATS will handle the processing of different retail payment streams. These will include:

1. Direct credit payment instructions, either individual or batched;
2. Files of direct debit instructions;
3. Files of electronic cheque records;
4. Bulk (one-to-many) payments;
5. Any other streams of high-volume low-priority payments.

5.2.1 Direct Credits

Proposals must contain details of how low value (retail) direct credit payments are handled in the ACH element, whether they are submitted on an individual or batch (file) basis.

5.2.2 Direct Debits

The ATS will provide a true direct debit capability which may be used to replace the present BillPay arrangements as described in 2.2.5. By offering a truly interbank electronic direct debit facility, this would mean that all such payments could be initiated and processed completely automatically, without the need for customers explicitly to initiate every payment via telephone or Internet banking. It would also remove the requirement for participating companies to maintain accounts at all banks.

Proposers must describe in detail how direct debits are handled in their proposed solution, and will be expected to demonstrate this in the proposal presentation meetings described in 8.4.3.

5.2.3 Cheque Processing

As previously described (2.2.2), cheques and warrants are currently the only interbank payment instruments in use. One of BPNG's major objectives of introducing the ATS is to establish a payments processing platform that will encourage the market to adopt more efficient, more cost-effective and safer electronic instruments. BPNG expects that the use of paper warrants will dwindle rapidly once the ATS is operational, but it is recognised that cheque usage will continue into the indefinite future, albeit at a (hopefully) reducing rate.

There is considerable interest among the banks in making the processing of cheques more efficient, which will be facilitated by the introduction of the ATS. The ACH element of the ATS must therefore contain the ability to clear files (batches) of electronic cheque records that have been captured using branch-level electronic cheque readers. Proposals should contain details and recommendations, both procedural and technical, of how the proposed ATS could handle and clear these records, including the facility to capture cheque records at bank branches.

BPNG recognises that the introduction of any automated cheque processing capability will first of all require agreement among banks on standardisation of cheques and handling arrangements before finalising the details of the associated ATS functionality. This will be done with the involvement of, and in consultation with, the successful proposer, and so BPNG expects that financial proposals will include an allowance for the necessary consulting effort and any required software development.

5.2.4 Bulk Payments

The system must have the ability to provide fully automated processing of the bulk payments described in 2.2.3, which currently require a degree of manual intervention.

Under the envisaged arrangement, participants will transmit composite payment instructions to the ATS. Each of these will contain the same information as contained in the current bulk payments, namely: (i) a schedule for a single beneficiary bank of payments (such as salaries) to be credited to one or more of its customers' accounts; and (ii) a single payment instruction for the total value of all such payments. This will replace the current arrangement whereby the schedule of individual payments is written to a CD-ROM but the actual payment instrument for the total is a cheque.

Proposers must describe in detail how their solution will handle this requirement. It is appreciated that bulk payments can be handled in different ways, and proposers are requested to describe all the facilities offered by their solutions for the processing of bulk payments.

5.2.5 Clearing

Proposals must contain details of all options provided by the ACH element for clearing the foregoing streams of payments (e.g. continuous or deferred netting) and how the resulting positions are settled in the RTGS element.

5.3 RTGS Element

5.3.1 RTGS Transactions

BPNG expects that the RTGS element of the ATS will handle settlement of the following:

1. Transactions involving transfer of securities (both primary allocations and secondary market trades) in the GSS following the principles of DvP and STP;
2. High-value and/or high urgency bank-to-bank payments;
3. Purchase of currency by banks;
4. Net interbank positions from the ACH clearing element of the ATS;
5. Net interbank positions from the Port Moresby cheque clearing house;
6. Bilateral net interbank positions from ATM and EFTPOS transactions, and in future multilateral net positions from a national card switch (yet to be established);
7. The Kina leg of BPNG's foreign exchange transactions, via an electronic interface to BPNG's CRMS;
8. (In future) equities transactions from POMSoX.

5.3.2 Settlement of GSS Transactions

The RTGS element must have a linkage to the GSS for the settlement of securities transactions which will include in the first instance:

1. BPNG primary market operations, for government securities issues;
2. Open Market Operations of BPNG;
3. Intraday liquidity management and other monetary policy operations of BPNG;
4. Settlement of secondary market transactions over Government securities.

For all such transactions, the principle of STP must be guaranteed. The operational interaction between the ATS and the GSS to guarantee DvP should be as described in 6.3.

5.3.3 Queue Management and Processing Priorities

The RTGS element of the ATS will operate on the basis of multiple payment streams or queues. Proposers should describe in detail the queuing mechanisms offered by their proposed solutions (including the maximum number of queues and queue types). Characteristics should include at a minimum:

1. The system should have the capability to ‘warehouse’ certain types of individual transactions for execution at a forward date and time, as specified by the submitting participant.
2. Queues will have different levels of priority. Participants must be able to assign priority levels to all payments submitted.
3. Certain queues will operate on a “first in, first out” (FIFO) basis, unless specific gridlock resolution routines are invoked by BPNG as operator.
4. The construction and operation of the queues must enable the treasurers at each participant to be reasonably sure that the payments they submit are generally processed according to the order in which they are submitted.
5. Payment orders will be held in each queue by participant, in the order in which the participant despatches them and according to the priority code assigned by the participant (there will be one queue for each priority level per participant). Each participant will manage only the queues for the payments that it has issued.
6. No lower priority transfers will be settled until all higher priority transfers are settled. The payment order at the top of the queue is settled when funds are available and only then is the next order in the queue considered for settlement.
7. In order to facilitate daily liquidity management, the system should offer participants the ability to change the priority of queued payments and/or position within the queue.
8. The RTGS element must be designed to avoid gridlock which could lead to systemic failure, and must contain a gridlock resolution mechanism.
9. The system must provide automatic queue management or intervention facilities to BPNG at the level of analysis, with calculated solutions being offered to BPNG operators for implementation. Such facilities should include reordering, optimisation routines etc.

10. Should any gridlock resolution be used either automatically or manually by BPNG, system participants should be notified.
11. Each participant and BPNG must be able to enquire into the aggregated information about the total number and amount of that participant's transfers in the queues.
12. The originating participant must be able to cancel a payment transaction held in the queue. A payment transaction can only be withdrawn if it has not already been settled.
13. Transactions with same-day value not settled by the end of the operating day will be cancelled (with advice to the participant).

5.4 *Liquidity Management and Interface to BPNG General Ledger*

Liquidity management is a critical element in the efficient and effective operation of an ATS or RTGS system, and therefore BPNG intends to give significant weight to these proposed facilities and functions in the proposal evaluation process. Proposers should therefore be careful to explain their liquidity management features and options (including any option for interfacing to an external Collateral Management System) in detail in their proposals, and also provide a clear demonstration and discussion of these features in the proposal presentation meetings.

5.4.1 Exchange Settlement and Cash Reserve Requirement Accounts

Each commercial bank has an Exchange Settlement Account (ESA) maintained in the books of BPNG, which is used for settlement of obligations to BPNG and other banks. In addition each bank has a Cash Reserve Requirement (CRR) account which holds the mandatory reserves.

ESA

During the operating day the ATS will hold the record of account for each ESA, while also being interfaced to BPNG's General Ledger (GL) such that transactions on the ESAs in the ATS are mirrored in the GL and vice versa. At end of day all transactions that have taken place in the ATS during the day will be transferred to the GL to enable a full reconciliation to be made between the ATS and GL, thus ensuring full integrity of BPNG's accounting processes.

Proposers should provide detailed recommendations as to how the linkage between the ATS and the GL will be implemented to ensure that the GL is kept synchronised with transactions processed in the ATS, and vice versa.

CRR Account

If BPNG decides to permit use of the CRR account for intraday liquidity provision, then the CRR account balance will also be transferred to the ATS at start of day along with the ESA balance. In this case the ATS must return the same value to the CRR at the end of the day. The system should not be able to close unless this amount has been returned, and it should generate an alert if the funds returned are as a result of an automated transfer from an intraday repo to an overnight repo (if it is decided to permit automatic overnight repos).

5.4.2 Sources of Liquidity

Sources of liquidity in the settlement account may be:

1. Correspondent accounts;
2. Incoming transfers;
3. Borrowing from other banks;
4. The CRR account (if permitted by BPNG – to be decided);
5. Credit extension from BPNG.

5.4.3 Intraday Liquidity

At any allowed time during the day a participant may request intraday liquidity from BPNG, which will be granted subject to the participant's making securities to the required value, including haircut, available as collateral via a repurchase agreement (repo) or possibly a pledge. Liquidating such securities should not require any intervention by BPNG operations staff. Proposals must contain full details of options for achieving this.

Both the concession of credit to banks and the corresponding transfer of securities to BPNG must be capable of being carried out completely automatically (but subject to manual override by authorised BPNG system operators) and simultaneously through execution of the necessary transactions in both the ATS and GSS components.

5.4.4 Extension of Credit from BPNG

The system should have flexible facilities for BPNG to manage the way in which it extends credit, both intraday and overnight, to participants. For example, BPNG may wish to impose limits on individual banks, or to limit the use of overnight credit to no more than a certain number of consecutive nights or no more than a certain number of nights in a month. Should these limits be exceeded, the system should have the ability automatically to notify the Financial Systems Supervision Department.

5.4.5 Earmarking Funds in Settlement Accounts

Either BPNG or the participant itself should be able temporarily to reserve or earmark a quantity of the funds in a participant's settlement account up to a given level to cater for known demands (for example for purchase of currency from BPNG or settlement of clearing house net positions). In such cases the earmarked funds may not be used for the purposes of settling any other ATS transactions.

It should be possible to set an earmark for a forward date. For example, banks order currency the day before they require delivery, so the earmark for currency purchase should be warehoused for execution the day after it is made.

5.4.6 Liquidity Problems

The system should notify BPNG and affected participants about any liquidity problems. The system should be able to monitor and provide notification of conditions including:

1. The possibility of an account balance below the minimum level;

2. A payment order larger than a specified amount;
3. Details of payments rejected due to insufficient funds.

Proposals should contain details of all such conditions which can be monitored.

5.5 Currency Issuing and Return

As the central bank, BPNG has responsibility for the circulation of PGK currency (notes and coins). Issuing and return of currency takes place at the Currency Department of BPNG in its head office in Port Moresby, and at three regional Currency Distribution Centres (CDCs) in Mount Hagen, Lae and Kokopo. The CDCs are managed and operated by BSP under a contract with BPNG.

At present all procedures associated with the issuing and receipt of currency are manual. This section describes how they might be automated using the ATS. Proposers are requested to describe how their systems would support these revised procedures, to comment on them and/or to suggest improvements or alternatives.

The following suggested procedures in 5.5.1, 5.5.2 and 5.5.3 assume that the Currency Department will have access to the RTGS element of the ATS.

5.5.1 Currency Withdrawal at BPNG Head Office

The numbers in brackets in the following narrative refer to figure 2 below.

1. The participant bank's branch which wishes to withdraw currency sends a withdrawal request in the form of a SWIFT MT202 message crediting BPNG, giving details of the currency it wishes to withdraw, to its head office (1)⁶.
2. The participant's head office submits the message to the RTGS element of the ATS (2). This alerts the ATS that a cash transaction has been requested.
3. On receipt of the order, the ATS advises BPNG's Currency Department immediately by suitable message (3).
4. If the Currency Department approves the transaction (4), the ATS will warehouse the MT202 for execution at start of day the following day (5). Flexibility could be built into the system to cater for alternative delivery dates, for example 'emergency' currency issues on the same day (probably with a charge), or a date further into the future than tomorrow. However, to date in PNG currency issues have always been made the day after the request is made to the Currency Department.
5. At the same time, the ordering participant is advised by a suitable message which contains an automatically generated code or 'secret' (6) that will be required to be presented by the collecting party.
6. The following day the transaction is settled in the ATS (7) at system start of day (physical collection of currency usually takes place around 10.00 a.m.), and a message is sent directly to the Currency Department authorising the

⁶ The instruction from the branch does not necessarily have to be an MT202, but it must be a correctly formatted MT202 by the time it is received by the ATS.

release of the currency (8). A similar message is also sent to the ordering bank branch.

7. The person collecting the cash will need to produce the code produced in (6) and will also need to prove authorisation, most likely by logging on to the system with their personal digital signature (9).
8. The ATS will then generate the necessary journal entries for BPNG’s GL identifying the branch from which the currency was issued.

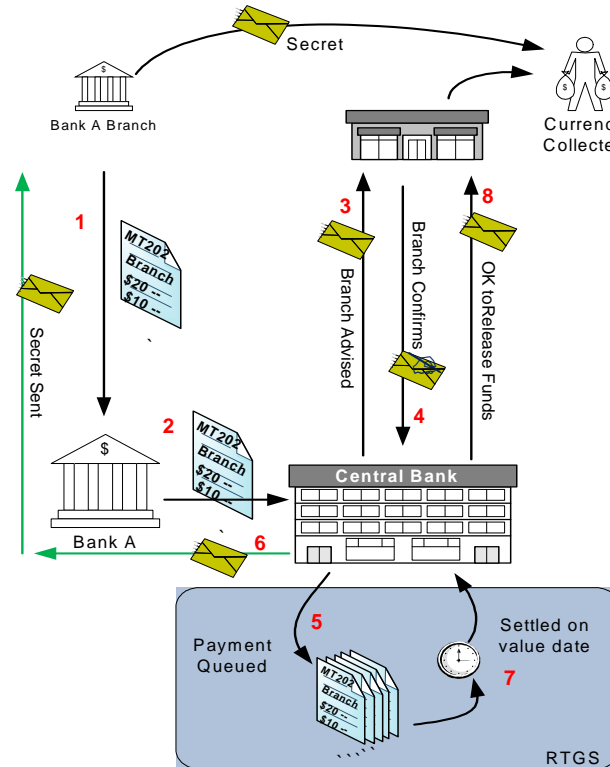


Figure 2 – Currency Withdrawal Process at BPNG Head Office

5.5.2 Currency Return at BPNG Head Office

‘Unfit notes’ can be returned to the Currency Department at BPNG head office at any time. When a return is made, the declared value is credited to the bank’s ESA, currently by way of a paper voucher which is raised by the Currency Department and passed to the Accounting Department for entry into BPNG’s GL. When the ATS is in place, this can be done by the manager of the Currency Department directly entering into the ATS an RTGS payment instruction to credit the bank’s settlement account. The ATS will then generate the necessary journal entry and pass it to the GL.

On selected currency returns, the Currency Department carries out a subsequent full note count. If the amount returned is found to be more than the declared value, currently the extra amount is paid to the bank via warrant. With the ATS, the

manager of the Currency Department will credit the amount directly to the bank's settlement account via an RTGS payment instruction.

If the returned amount is found to be less than the declared amount, at present the Currency Department sends to the offending bank's head office a "drawing" which is a paper demand for repayment of the discrepancy. The bank's head office checks with the branch concerned and then repays the discrepancy via warrant. With the ATS, it is planned that the Currency Department will still send a drawing, but this can be done using the participant messaging feature of the ATS rather than a paper document. At the same time the Currency Department will raise a journal entry in the GL so that the expected repayment can be tracked. The bank will make restitution by payment to BPNG through the RTGS element of the ATS, which will raise the corresponding GL journal entry indicating that payment has been made.

5.5.3 Currency Distribution Centres

Outside Port Moresby, CDCs are used by all commercial banks for withdrawal or return of currency. BSP manages and operates the CDCs under contract from BPNG, but the actual currency holding in each CDC remains the property of BPNG. Therefore the movement of currency (in and out) between BPNG head office and the CDCs is a question of internal financial transfers within BPNG and thus the concern only of the GL. It does not affect the payments system (ATS).

At CDCs, each commercial bank makes a daily withdrawal or deposit, depending on whether it has a shortfall or surplus of currency, generally in the morning. At present the manager of each CDC sends a return to the BPNG Currency Department by fax at end of day with details of the movements during the day. The Currency Department then raises the necessary BPNG GL journal entries (on paper) to debit or credit the banks' ESAs.

With the ATS, it seems that there are at least two possibilities to update these arrangements. Neither offers a fully-automated solution, but in either case there is some mitigation of risk. Proposers are invited to put forward their own solutions for managing currency withdrawal/return at CDCs in an environment where the CDCs will not be networked directly into the ATS. The possibilities are:

1. Each CDC is a BSP, not BPNG, location and its manager is a BSP employee. BSP has an extensive internal network linking all its locations and so the CDC manager could use the BSP network to send details to BSP's Port Moresby head office of each bank's withdrawal or deposit, either at time of transaction or at end of day as currently. Clearly BSP cannot raise RTGS payment instructions affecting other banks' settlement accounts, so there would need to be a way to translate the electronic reports from the CDC managers into RTGS payment instructions in the ATS.
2. The system could continue as at present, with end-of-day reports being faxed by CDC managers to the BPNG Currency Department. On the basis of these reports the Currency Department could create the necessary RTGS transactions to update the commercial banks' settlement accounts. This would obviously have to take place before close of day in the ATS. It also has the potential drawback that actual currency transactions may take place in CDCs some hours before settlement occurs in the ATS, thus giving rise to some (at present small) element of risk.

5.6 Management of Government Transactions

5.6.1 Department of Finance – Integrated Financial Management System

DoF is currently in process of implementing a new centralised Integrated Financial Management System (IFMS) which will support financial management across all GPNG Departments and will replace the current PGAS system (see 2.6.1.1). The IFMS will be physically located in a single central computing facility, operated by the Department of Finance, for all Departments. Once it is fully implemented, no Department will operate its own financial management system. Departments will function as separate reporting entities within the IFMS, i.e. have a balanced trial balance (Departmental debits and credits will balance – it will not be possible to have a debit in one Department and the corresponding credit in another Department).

Under IFMS therefore, although the management of its financial affairs will still be the responsibility of each individual Department, all actual outgoing payments for all Departments will be generated centrally by the Accounts Payable module of IFMS once it has been fully implemented. Until the ATS is operational, these payments will be effected by Departments producing their own cheques through printers located at their Departments (there will not be a central point of production for cheques).

Once the ATS is in operation, both BPNG and DoF are agreed in principle that advantage should be taken of the consequential opportunity for fully-electronic generation and processing of GPNG payments, and that the creation of payments should be switched from Department-printed cheques to transmission of electronic payment instructions from IFMS to the ATS as much and as soon as possible.

BPNG is working with the IFMS project team to agree how this can be achieved, and to develop a timetable for introducing fully-electronic payments. IFMS will go live with three initial Departments before the end of 2010, and DoF is then planning to move up to 18 other Departments to IFMS in 2011 and the rest in 2012 (there are 35 Departments in total).

The outline plans agreed so far will entail connecting BPNG to the Finance Metropolitan Area Network, which is a high-speed WiMAX-based network operated by DoF with connections to all Departmental locations in the NCD. Using this connection, IFMS will transmit electronic payment instructions to BPNG for clearing through the ATS. The connection from IFMS will not be made directly to the ATS, but to BPNG's Oracle Financials package. This will give BPNG Banking Operations staff the opportunity to check payments if desired for potential anomalies and fraudulent transactions, in the same way as they currently vet incoming cheques before clearing them through Departmental drawing accounts. This will also allow Banking Operations to hold payments in the case that there are insufficient funds in the WPA to cover them, and to reach an agreement with DoF for replenishing the WPA. Once checked and cleared for payment, the payments will be passed to the ATS for clearing.

Proposers should comment on, and/or suggest improvements or alternatives to, the above outline arrangements, and provide details of how their solutions will manage the linkage between IFMS and the ATS in order to achieve, so far as possible,

automatic receipt, clearing and settlement of all electronic payment instructions received from IFMS.

Proposers should also take note that the Papua New Guinea Financial Intelligence Unit (PNGFIU) has recently issued a guideline to all banks (including BPNG) for exercising due diligence in relation to government cheques and payments. The successful proposer will be required to work with both DoF and the PNGFIU to ensure that the ATS will support this process.

5.6.2 Customs Service

The present arrangement for collection of Customs duties is described in 2.6.1.2. As noted there, both the Customs Service and a number of Customs brokers are interested in taking advantage of the facilities that will be provided by the ATS to speed up the payment process for import entries. Using electronic payments via the ATS will also reduce the manual effort and risk associated with using paper instruments (cash and cheques). Proposers are requested to comment on, and/or suggest improvements or alternatives to, the following suggested procedure which has been discussed between BPNG and Customs. Financial proposals should include an allowance for the necessary consulting effort and software development to achieve this.

This procedure assumes that electronic connections are in place (in addition to the existing connections between brokers and ASYCUDA) between: (i) brokers and their banks' core banking systems; and (ii) the ATS and ASYCUDA. It also assumes that at least one of the commercial banks will make the necessary amendments to its core banking system so that this facility can be offered as a service to its customers. It may additionally require some changes to ASYCUDA.

The numbers in brackets in the following narrative refer to figure 3 below.

1. As at present, the broker enters details of the import entry (Customs Declaration) into ASYCUDA (1), which processes it, calculates the duty payable and assigns a Registration Number (2). The Registration Number is in the format yyyynnnnnAnnnnnn, where yyyy is the year, nnnnn is the Customs office number, A is a serial letter and nnnnnn is the serial number of the Customs Declaration.
2. The broker, either manually or via its in-house IT system, sends details of the Customs Declaration to its bank's core banking system, via either Internet banking or a secure on-line connection (3). These details will include: (i) the Registration Number as per 1 above; (ii) the amount of duty payable; (iii) an indicator field showing whether the payment is being made by the broker or the importer; and (iv) either the broker's or the importer's 17-character tax code.
3. The bank's core banking system converts the information to an RTGS payment instruction (e.g. customised MT103) in favour of the WPA in BPNG and sends it to the ATS (4).
4. Subject to the normal ATS queuing rules, etc., the ATS settles the payment immediately and notifies the bank in the usual way as for any RTGS payment (5).

5. The ATS also generates a message to the Customs Service (either an automated message directly to ASYCUDA or possibly an email message to the relevant Customs office) confirming that the payment has been made and settled and quoting the Registration Number of the Customs Declaration (6).
6. (Optionally) the bank notifies the broker that the payment has been successfully made (7). If the notification has been made to ASYCUDA, then the broker could get confirmation of payment via that means.
7. Using the Registration Number of the Customs Declaration to identify the import shipment, the broker collects the goods from the Customs office.

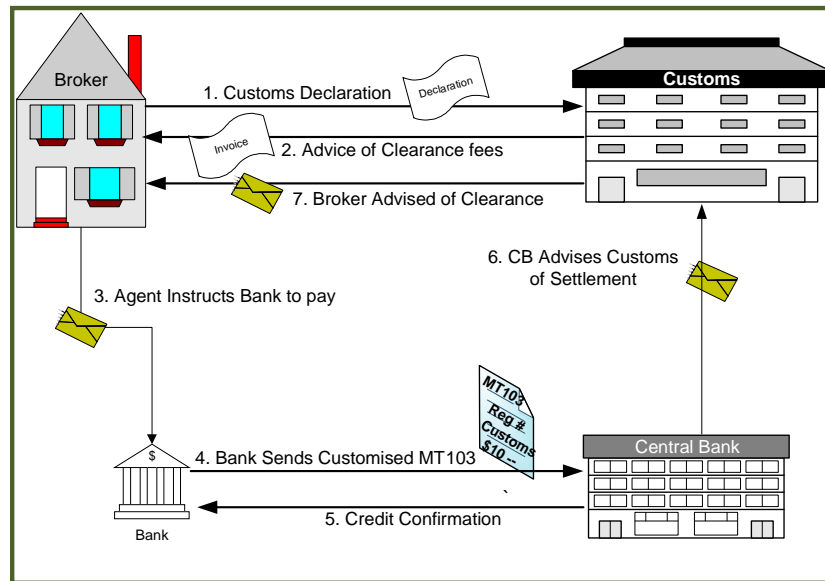


Figure 3 – Suggested Process for Payment of Customs Duty

5.6.3 Internal Revenue Commission

In April 2010 the IRC signed a contract with the Canadian company CRC Sogema to implement the Revenue Administration System Redevelopment Project. The first phase of this project covers analysis of IRC's processes and procedures with a view to introducing a new integrated information to be based on CRS Sogema's Standard Integrated Government Tax Administration System (SIGTAS) system. The successful proposer will be expected to work with IRC and CRC Sogema to achieve a suitable level of integration between the ATS and SIGTAS for supporting fully electronic collection of taxes.

5.7 *Interface to Participant Bank Systems*

5.7.1 Messages

As a minimum the system must support SWIFT standard MTnnn formats for all messages.

BPNG's preference is for the system to use ISO 20022 (UNIFI) formats for all messages, both RTGS and low value (ACH). Proposers should provide information on all standards that their systems follow, particularly their forward development plans in this area.

5.7.2 Participant Terminal Equipment

For single payments, access may be from either a single dedicated PC for smaller institutions or any number of authorised workstations and users on the LAN in the case of larger participants.

5.7.3 Integration with Participants' Core Banking Systems

The system must provide standard linkages to enable straight-through processing (STP) for all payment types. This will require participants to carry out the necessary systems work to integrate their core banking systems with the ATS. The selected supplier of the ATS will be required to work with the commercial banks to assist them to do this, to provide full interface specifications for implementation of STP at no charge, and to provide any necessary technical support and advice during the implementation process.

As all four commercial banks use the same core banking package (ICBS), BPNG will explore with the banks and the contractor the possibility of implementing a common set of linkages for all. Proposers should give references for any countries where they have implemented an interface between their system and ICBS.

5.8 *Monitoring and Reporting*

The system must provide a comprehensive and flexible set of monitoring, reporting and analysis capabilities, to enable each participant to have maximum information about, and control over, its participation in the system (analogous to the way users of online banking services can control all activities of their various accounts themselves via an internet web browser connection).

The monitoring, reporting and analysis capabilities should cover:

1. Intraday monitoring reports;
2. End of day reports;
3. Reports on historical system activity.

In the case of participants other than BPNG, these facilities must be strictly confined to their own participation in the system, whereas BPNG must be able to get information on the operation of the entire system.

The intraday monitoring facilities should be available on demand, while the end of day reports should be provided automatically to specified users within both BPNG and participating banks.

The historical analysis facility should provide a wide range of capabilities, including both a flexible database enquiry capability and also the ability to download extracts from the historical database for further analysis using tools such as statistical analysis or spreadsheet packages. This facility will be available to non-BPNG participants only via requests to BPNG Payment Systems Department.

The historical database must be held separate from the online (current day's) database, for reasons of both performance and security. BPNG will agree with the successful proposer how many months' historical data should be held online (as opposed to offline archiving) during system implementation.

5.8.1 Intraday On-line Information for BPNG

The system should provide at least the following information to BPNG operational users, authorised departments and auditors:

1. Single message and input batch file status;
2. Total daily, weekly, monthly, and annual activity (for each originating participant and receiving participant);
3. Possible duplicate message reports;
4. All account balance information, by participant;
5. Enquiry into payment instructions in the system (allowing for different selection criteria);
6. Alerts when queues build up beyond defined limits in terms either of number of payments or of amounts to be paid. Such limits will be defined by BPNG;
7. Summarised security reports regarding unsuccessful log-on attempts, invalid messages (with reason for invalidity);
8. A graphical display showing the status of payment queues, and indicating areas of gridlock etc. Such a display would be incorporated into the 'dashboard' described in 4.8.2.

5.8.2 Intraday On-line Information for Participants

The following will apply to participants:

1. Participants will receive an immediate message for all payments made or received by them;
2. In case of service disruptions at a participant, BPNG must be able to notify all participants of the situation and of any extension of the normal operating day that may result from this situation;
3. A participant must be able to trace any individual transaction or batch through all stages of processing;

4. Participants should be able to enquire on the status of their payment queues throughout the day as well as the running balance of their respective settlement accounts. The system should provide at least the following information to participants:
 - a. Enquiry access to the participant's own settlement account balance;
 - b. Enquiry into payment instructions in the system (allowing for different selection criteria);
 - c. Notification of the status of payment instructions sent/received debited/credited, whether successfully processed or rejected;
 - d. Validation error description;
 - e. Enquiry access to their own outgoing queues;
 - f. Enquiry into calculated intraday daily average balances;
 - g. Transaction activity and charges;
 - h. In addition to the online flow of information during the processing day, each participant will be provided with an electronic file containing sufficiently detailed information to support automated account reconciliation. This information can be sent throughout the day in response to requests received from the participant;
 - i. A full, daily statement will be sent to each participant as part of end-of-day processing.

5.9 Account Maintenance and Monitoring

5.9.1 Account Opening and Closure

BPNG will have the authority to open, close or suspend any account held within the system. If an account is suspended, no outgoing payment transactions may be made, but the system should enable BPNG either to permit or to disallow incoming payments to be received.

5.9.2 Maintenance of Intra-day Credit Limits

BPNG will have the authority to determine and operate all arrangements relating to the provision of intra-day credit.

5.9.3 Account Monitoring by BPNG

For system management purposes, BPNG will have access to all settlement account information. The system should have comprehensive facilities to display online information on the overall liquidity situation of the system, both continuously throughout the operating day and as a snapshot for the current period and compared to previous period (hours, days, and weeks), via the dashboard capability described in 4.8.2.

5.9.4 Settlement Account Histories

The system should maintain on-line records of settlement account transactions for the current month and archives of the historical data for the period as provided for by the law (seven years). The system should provide a range of graphical capabilities to assist activity and liquidity monitoring; for example, a graphical display representing the number of queued payments per bank and the current performance indicators.

5.10 Linkages to External Systems

The ATS will have a number of linkages to external systems, including:

5.10.1 BPNG's accounting system (Oracle Financials version 11i)

This is a critical linkage which will be used for a variety of purposes. The ATS must work as a mirror system to the accounting system, to facilitate payments on the ESAs which will be copied into the ATS at start of day. The ATS will be responsible for maintenance of these accounts with BPNG during its operating hours. In addition the ATS will be required to generate the requisite journal entries for payments made or received by BPNG on its own or GPNG's behalf, to ensure these are posted to the correct accounts in the GL.

The interface to the accounting system will also be used for submission of payments by BPNG, both on its own account and on behalf of GPNG (see 5.6).

5.10.2 The GSS

This is another critical linkage, as described in 3.3.1.

5.10.3 BPNG's Comprehensive Reserves Management System (CRMS)

This linkage will be used for settlement of:

- Movements in BPNG's own securities portfolio (purchases and sales of securities); and
- The Kina leg of BPNG's forex transactions;

5.10.4 BPNG's data warehouse

This will not strictly speaking entail a special linkage, but rather the necessary data extraction capability will be developed by BPNG's database administrator, for which purpose the successful proposer will be required to provide detailed database schemas for the ATS database.

5.10.5 Participants' in-house core banking systems

The objective of this linkage is to support a high level of automation of participants' payments transactions based on the principles of Straight-Through Processing (STP), and to enable participants to start offering new electronic interbank payment services to their customers.

5.10.6 Government Systems

These are expected to include: the Department of Finance's Integrated Financial Management System (IFMS); the Customs Service's ASYCUDA system; the Internal Revenue Commission's SIGTAS system; and the Department of Treasury's debt management system (CS-DRMS). Specific details of the required functionality and interfaces will be developed by the contractor in co-operation with BPNG and the relevant Departments.

5.10.7 Future interbank card switch

BPNG's strategy for development of the National Payments System envisages the introduction of an interbank switch for processing of all EFTPOS and ATM transactions. Implementation of the switch will take place after the ATS has gone into live operation. The objective of the linkage will be for the settlement of net interbank positions from the card switch.

5.10.8 Possible future trading systems

These may include an interbank money market and/or forex trading system.

5.11 Participants and Volumes

5.11.1 Participants

1. All four commercial banks and BPNG will be participants in the system and will hold settlement accounts in the ATS.
2. The system may allow indirect participation. For this purpose it will maintain a directory of participants.

As described in 5.6.1, it is currently planned that GPNG payments will be submitted to the system via an electronic link between DoF and BPNG, but DoF will not be a direct participant in the ATS. Interfaces will be required, however, between the ATS and systems installed in DoF, IRC and Customs for the purpose of reporting on payments made/received.

5.11.2 Volumes and Performance

The usage volumes of current instruments (bulk payments, cheques and warrants) are given in earlier sections (2.2.3 and 2.3.1). Volumes of interbank payments, particularly from GPNG, are expected, however, to increase significantly in the next few years once the ATS is operational, as electronic payment instruments become more widely available and accepted, the economy continues to grow, and new methods of payment are introduced. In particular the overall GPNG budget (including provincial and local government) is forecast to triple in the next decade⁷. It is therefore difficult to specify the required processing capacity for the ATS.

⁷ Source – discussion with DoF.

Proposals should contain benchmark data to indicate the number of transactions of different types per minute or hour that the proposed solution is able to process, on the target hardware configuration. This information should also indicate both any constraints and growth paths available.

6. Specific Functional Requirements for the Government Securities System

The primary purpose of the GSS will be to allow the maintenance of accurate records of transactions relating to BPNG and GPNG securities in the capital markets. To this end it will contain both depository and primary market (auction) functionality.

Note: this section is included for proposers' information, as BPNG expects to continue to use its RMS for the specified functions. In the interests of completeness of information, however, proposers are asked to provide a response to this section.

6.1 Objectives

The main objectives of the GSS are the following:

1. Provide an online centralised electronic registry for all GPNG and BPNG (and in future potentially other issuers') securities which will meet the needs of all issues, issuers, holders, managers and other interested parties;
2. Improve the efficiency and the security of the system by operating on the basis of both Delivery versus Payment (DvP) and Straight-Through Processing (STP), through linkages with the ATS component;
3. Integrate the clearance and settlement of all government securities transactions;
4. Support intraday liquidity management and other monetary policy operations of BPNG;
5. Support portfolio management by instrument and maturity profile;
6. Facilitate entitlement processing including redemption, interest and tax payments;
7. Facilitate the electronic processing of repurchase agreements (repos);
8. Provide online enquiry facilities to all legitimate enquirers.

The GSS will be closely-coupled with the ATS: (i) to ensure Delivery versus Payment (DvP) for transactions in Government and BPNG securities; and (ii) to support the process of intraday liquidity management in the ATS.

6.2 Functional Characteristics

The GSS should provide at least the following functions:

1. Maintain a register of all GPNG and BPNG securities issued by amount, interest rate, maturity date, holder, price and other pertinent information;
2. Maintain a register by different layers of all counterparties (securities holders and dealers), detailing whether the depositor is direct or indirect, and all relevant static information such as: name, physical address, email address, telephone, tax registration number, etc. All counterparties must be identified by codes that will enable easy searching of such information;

3. Have a settlement application tightly linked with the ATS component, for the settlement of primary and secondary market operations, open market operations of BPNG and intraday liquidity operations, so as to guarantee that the principles of DvP and STP are respected. This settlement application should also serve as a facility to settle interest and maturities on debt securities, and in future may be required also to settle corporate securities;
4. Incorporate a primary market capability to manage the issuance of all relevant securities;
5. Contain functionality to support portfolio management by BPNG for its own holdings, and for other participants;
6. Be capable of supporting a linkage to any future electronic inter-bank collateralised funds market trading system;
7. Be capable of supporting a linkage to the PETS electronic trading system operated by POMSoX, if required in future, implementing DvP and STP for settlement of equities trades;
8. Adhere to ISO 15022 message formats in conformance with the minimum international standards for messages generated, as set by the BIS Guidelines;
9. Provide a single, integrated view of each dealer’s position for monitoring, supervising and controlling their liquidity;
10. Generate detailed and summary reports with the capability of online viewing before printing and downloading to external applications;
11. Allow enquiries by BPNG and the Department of Treasury.

6.3 Delivery versus Payment (DvP)

The system must support DvP Model 1 as defined in the BIS document: *“Delivery versus Payment in Securities and Settlement systems”*⁸.

The GSS must provide an automated and efficient interface to the ATS component to enable changes of securities ownership in the Depository to be simultaneously matched with exchanges of value in the ATS component for true DvP processing. Transfer of ownership cannot occur until a confirmed payment message is received from the ATS component.

6.4 Functionality

BPNG wishes to ensure that the GSS component provides a leading edge, world-class capability to the Government and financial markets of PNG. The GSS must therefore contain a comprehensive set of functionality to support the objectives and characteristics described above. Proposers must provide full details of the functionality offered by their proposed solutions.

⁸ See <http://www.bis.org/publ/cps06.pdf>

6.4.1 Roles

The GSS should provide support for different, and multiple, roles by participants such as:

- Registrar;
- Broker;
- Issuer;
- Administrator;
- Regulator/overseer;
- Beneficial Owner;
- Holder.

It should additionally support different types of User/Trader classifications including, for the traders:

- Traders acting as beneficial owners;
- Traders acting on behalf of other beneficial owners;
- The activities carried on by traders should be recorded in the “type of trade” record. Each trader should be able to act both ways.
- Ability to handle fixed rate bonds and the repricing of variable rate bonds according to the algorithms determined by the issuing authorities.

6.4.2 Entitlement Processing

The GSS must automatically generate entitlement proceeds to be credited to registered instrument holders on the due date. The interest proceeds must be reconciled against the original issue portfolio and passed to the ATS component for payment to the relevant beneficiary by settling on the account of the intermediary or the beneficiary’s commercial bank.

6.4.3 Tax

The entitlement processing module must calculate tax due on entitlement payments (ensuring that no tax is deducted from holders marked as tax exempt), deduct the tax payable prior to payment to the beneficiary, and transfer information on all taxes deducted to the ATS component with: (i) an RTGS payment to GPNG’s Waigani Public Account (WPA) for the total tax collected; and (ii) details of individual deductions including amount, taxpayer ID, etc., to be transmitted to IRC for updating their taxpayer system.

GPNG may change the rate of tax at any time, and so this must be easily updatable in the system by authorised BPNG staff.

6.4.4 Management of Issues

It must be possible for the same bond issue to be re-opened for further subscription until some pre-determined maximum size is reached. For such re-opened issues, the GSS must update all relevant issue identification and summary data, including the addition of the numbered units of value in the additional re-opened issue.

The system must also be able to handle tap issues of Central Bank Bills as defined in 2.4.2.1. A tap issue is made for a set amount and is closed only when it is fully subscribed. Each individual allocation is made on the day of purchase.

Both fixed rate bonds and the repricing of variable rate bonds must be handled according to the algorithms determined by the issuing authorities.

6.4.5 Portfolio Management

The GSS will contain a comprehensive range of standard portfolio monitoring and management functionality to allow BPNG to define and manage its own portfolio of financial assets.. These will include:

- A valuation (mark-to-market) function;
- Calculation of daily accrued interest (gains and losses on the portfolio) with automatic generation of journal entries for posting to BPNG's GL.

6.4.6 Repurchase Agreements (Repos)

The GSS must have the ability to handle repos (including the ability to handle multiple securities in a single repo) by recording the change of ownership and the associated obligation to sell-back in the agreed number of days. A repo cannot reach maturity later than any of its underlying assets.

6.5 *Beneficial Owner and Holder Information*

The Beneficial Owner record is the record of ownership of securities. It may be a single person or organisation, or a number of people and/or organisations.

A Holder is an individual person or organisation. All holders must be identified by a unique identifier (UID).

The system must be able to record ownership registration records against the lowest level of issue component recorded.

6.5.1 Beneficial Owner Record

The GSS must hold a record of each beneficial owner of a security. The Beneficial Owner record must include:

1. A unique identifier referencing the Beneficial Owner. In the case of a single holder this could be the UID. Where there is more than one holder, the Beneficial Owner record must identify the Holders (see "Holder Record") below;
2. An indication if the Beneficial Owner is a single Holder or a group of Holders;
3. Who may request a change to Beneficial Owner record or authorise the trading of securities, or if such activity requires all holders to agree;
4. Similarly payments instructions for entitlement payments.

6.5.2 Holder Record

Holders must be unique within the system. The Holder record will maintain basic information for the purposes of ensuring any holder is only recorded once in the system. Dealers will be expected to keep this information up to date, but may hold additional information in their own systems linked to the Holder record in the GSS. The holder record must include:

1. A UID that is unique in the system, and has the ability to be validated using an appropriate validation routine;
2. Normal contact fields such as first name, last name, address, telephone number and e-mail address, each of which is searchable;
3. Domicile information;
4. An indication of whether the holder is tax-exempt;
5. Economic classification (e.g. coffee grower, commercial bank...).

Holder records should be marked as inactive if there has been no movement in their account for 12 months. The holder can be reactivated but only by explicit action on the part of the BPNG Financial Markets Department.

6.5.3 Beneficial Owner and Holder Functionality

The following functionality must be available:

1. A Dealer must be able to view only those Beneficial Owners and Holders for whom that Dealer is the Custodian;
2. Any securities movement instruction must include the Beneficial Owner and Holder references;
3. The system must be capable of generating messages to the Beneficial Owner and/or Holder when any securities movement has occurred;
4. Authorised BPNG officers must be able to see all holdings in the GSS by Beneficial Owner and Holder;
5. There must be a facility to check for possible duplicates to reduce the possibility of one person having more than one Holder record;
6. The system must have the ability to issue statements as required;
7. The system must have the ability to compute and deduct tax obligations as specified in 6.4 (5) based on parameters set on individual UIDs.

6.5.4 Holder Access to Information

The GSS must have the ability to produce statements on demand at a Holder's request. The system must have the ability to charge Holders for this function.

6.5.5 Internet Access to Information

BPNG wishes to explore the possibility of introducing a GSS facility to make holder records available over the Internet. This would allow Holders and Beneficial Owners to visit a secure website where, once authenticated, they will be able to see all their

holdings independently of the Dealers. Proposals should contain details of how this can be achieved in conjunction with their proposed solutions.

6.6 Primary Auction Module

The GSS must contain an integrated module to manage the primary market in government and BPNG securities.

6.6.1 Functionality

The primary auction module should include the following functionality:

1. Acceptance of bids submitted electronically, by issue, from participants at remote locations (over secure telecommunications connections), with posting of these bids within the system until the formally advised time for bid closure is reached. Bids received must not be visible to any party either within or outside BPNG until the cut-off time for bids is reached.
2. The ability for BPNG to set prudential limits on the total bid value to be accepted from any particular bidder in respect of any particular issue.
3. The ability to include or exclude any listed available bidder so that certain issues can be restricted in the primary market to a subset of all registered primary market traders.
4. The ability to calculate the acceptance and rejection of bids according to the highest prices offered and the total value and composition of the issue to be allocated.
5. The ability automatically to prepare, produce and transmit appropriate acceptance and rejection notices, payment advices and receipts.
6. The ability to maintain a register of all allocations for historical reporting. This may be retained in the GSS as a record against the full issue held at summary and portfolio level.
7. Automatic cut-off of bid acceptance at the time published for bid input cut-off as notified in the issue by BPNG. This time limit for bid input must be able to be set at screen level by BPNG for each issue.
8. The ability to keep a tap issue of CBBs open until it is fully subscribed.
9. The bidding system must be able to accommodate both multiple price and single price auctions.
10. On Bid price input cut-off, the primary market trading system must calculate the allocation of the issue to the successful bidders according to the prices offered, to bidder financial limits, and any percentage of the issue which may be reserved for special sale to selected other institutions at other than full market rates.
11. The ability to print certificates for bidders who request them.
12. The system must provide reports to both BPNG and bidders at the completion of the issue auction in respect of:

- a. Advice to dealers of all issue components issued by amount, unit value, price, etc. This should include confirmation of summary information regarding the type and nature of the issue, interest payable, maturity date and the range of unit reference/identity numbers allocated to the new issue components for that dealer.
- b. Advice to BPNG and/or Department of Treasury of the composition and rates of the issue allocation by buyer, amount, rate, etc. This must include calculation and display of the yield curve for the issue.

6.6.2 Participants

The participants in the primary auction are currently:

- The four commercial banks and 12 Registered Bidders (Savings and Loans societies and finance companies) for BPNG issues (CBBs);
- The four commercial banks and 49 Registered Bidders for GPNG issues (T-Bills and Inscribed Stock).

The primary auction module must enforce the above (ensure that only the 12 Registered Bidders can bid for CBBs).

Proposers should note that BPNG is considering reducing the number of Registered Bidders in the primary market, with a view to encouraging a more active market.

6.7 Linkages to External Systems

6.7.1 CRMS at BPNG

The GSS will have a linkage to the CRMS for the following purposes:

- Transfer of information on BPNG's own purchases of inscribed stock (whether purchased at a discount or premium);
- Receipt of information from CRMS on movements in BPNG's portfolio (purchases and sales of securities).

6.7.2 CS-DRMS at the Department of Treasury

The Department of Treasury currently uses the CS-DRMS system for debt management. The GSS will have a linkage to this system for the following purposes:

- Receipt of information/instructions on new issues of T-Bills and inscribed stock;
- Transfer to CS-DRMS of details on allocations following an auction of T-Bills or inscribed stock;
- At the beginning of the year, calculation and transfer to CS-DRMS of a detailed schedule of payments due to be made during the year;
- Notification of payment due on coupon payment or maturity of an issue;
- Transfer to CS-DRMS of portfolio management information as per 6.4.5.

7. Implementation and Support

BPNG expects the provision of exceptional service quality from the successful proposer. This section specifies the service requirements that must be satisfied to ensure successful implementation of the entire system.

7.1 Business Level Consulting

In light of the fact that the introduction of the IPPS is a new development for Papua New Guinea, and that BPNG has consequently little experience in this field, BPNG expects that the contractor will provide a high level of business consulting and advice – in addition to technical support – throughout the project period, drawing on its international experience in payment systems implementation.

Proposers must therefore provide details of the support they will provide in this area, not only in finalising the specific functional characteristics of the ATS and GSS, but also covering aspects such as the development of operational rules and procedures, system charging regimes and any other areas where the Proposer feels that it can offer guidance on good practice and avoidance of pitfalls, consistent with international best practice. In particular the successful proposer will be required to provide example/boilerplate documentation for system rules, participant agreements, operating procedures and charging policies. Significant weighting will be given to this aspect of proposals in the evaluation process.

7.2 Project Plan

Proposals must contain detailed project plans showing how proposers intend to carry out all aspects of the project. Project plans must address at least the following subjects:

1. Project organisation and management (both the proposer's team and expectations of BPNG's involvement);
2. Phases of the project execution showing sequencing, activities and deliverables for each phase;
3. Development of detailed business and functional requirements and system specification;
4. System development, delivery and installation;
5. System integration;
6. Training;
7. Documentation;
8. Change management;
9. Installation and acceptance testing;
10. Warranty and post-warranty service;

11. Task, time and resource schedules showing the estimated duration, sequence, resource allocation and interrelationship of all key activities and resources needed to complete the contract;
12. a detailed staff deployment schedule.

The winning proposer's (contractor's) project plan will be refined and updated as necessary by discussion and agreement between BPNG and the contractor during the first phase of project execution. Once this has happened, it will become the Agreed Project Plan and will be subject to formal change control between the contractor's and BPNG's project managers.

7.3 Proposer's Staff

Proposals must describe the structure, competences, roles and responsibilities of the proposed project team, including CVs for all proposed team members. To ensure maximum knowledge transfer, the contractor's project team should be structured to work with counterparts within BPNG, and proposals should therefore show the proposer's expectations of BPNG team structure and management, together with roles and responsibilities. A detailed staff deployment schedule must also be provided showing the planned engagement of each team member at each stage of the project, both on-site in Port Moresby and in home office.

The project team must include key specialists and alternates in at least the following areas:

1. Project Manager;
2. High value/high priority payment processing systems (RTGS);
3. Low value and bulk (retail) payment processing systems (ACH);
4. Government securities depository and settlement applications;
5. Systems integration;
6. Information and Communications Technologies (ICT);
7. Training of non-technical end-users.

Each key specialist must have at least ten years of relevant experience, with the last five years in his/her specialist area, and at least three years of industry experience in a team leader position.

BPNG expects that the winning proposer's project team, particularly the key specialists, will be assigned to this project throughout its duration. Should any of these persons become unavailable for the project for reasons outside the contractor's control, the contractor must appoint alternate persons of at least equivalent capability and experience, always subject to the approval of BPNG.

7.4 Project Management

The following paragraphs give BPNG's expectations as regards overall project management. Proposers are invited to comment on them and to propose any variations or modifications as they see fit.

7.4.1 Steering Committee

BPNG will appoint a steering committee which will have oversight of the project and will have final responsibility for all aspects. The steering committee will liaise as required with the responsible subcommittee of the National Payments Council. BPNG's project manager will act as secretary to the steering committee.

The steering committee will meet regularly during the project to consider the minutes of the previous progress meeting, review progress and approve any actions proposed by the project managers. Both project managers (see next paragraph) will attend steering committee meetings.

7.4.2 Project Managers

BPNG and the contractor will each appoint a project manager who will have overall responsibility for ensuring the successful and full discharge of their respective parties' obligations under the contract. To this end the two project managers will work closely together at all stages of the contract.

7.4.3 Progress Monitoring

Throughout the project execution the contractor's project manager will submit to BPNG's project manager a monthly progress report covering:

1. Results accomplished during the preceding month;
2. Any deviations from the Agreed Project Plan, corrective actions to be taken, and proposed revisions to the project schedule;
3. Other issues and outstanding or potential problems, and proposed actions.

The two project managers will hold regular formal progress meetings at a frequency to be agreed, but no less than monthly. These meetings will be used to consider progress to date (including the contractor's monthly progress reports), agree actions to be taken to resolve problems, and update the project plan as necessary.

The project managers will invite other project team members to take part in the progress meetings as necessary.

Written minutes of all meetings and agreed actions will be taken by BPNG's project manager and circulated to all affected parties as applicable, including the steering committee.

7.4.4 User Group Meetings

A user group will be established, whose membership will comprise representatives of all involved BPNG departments, participating banks and other institutions as applicable. BPNG's project manager will convene regular meetings of the user group, at which the two project managers will report on progress and consult on any project aspects requiring user involvement.

7.5 Testing and Acceptance

The full system will not be finally accepted (i.e. achieve Operational Acceptance) until all functionality has been fully tested and shown to be working correctly at all locations, including participants.

7.5.1 General

The installation and testing process will demonstrate (for all system components):

1. Ease of installation and system start up;
2. Operation of the system platform;
3. Operation and management of the complete system by non technical staff;
4. Reliable and efficient automated communications interfaces;
5. High reliability and fast recovery in case of failures;
6. Effective and correct operation of all system linkages;
7. Complete integrity of processing and accurate responses to all system information enquiries;
8. Ability to handle expected and peak workloads;
9. Clear and effective documentation and other support materials;
10. Effective education and training;
11. Effective organisational arrangements for full scale operation;
12. Effective support organisation;
13. Effective problem reporting, tracking and resolution procedures.

7.5.2 Acceptance Testing

Successful completion of the contract will be attained through a series of formal acceptance tests performed on all aspects of the overall IPPS. Payment will be directly related to successful completion of agreed milestones.

The acceptance tests will demonstrate that the contractor has met each requirement specified and agreed in the contract and has delivered all required reports and documentation and an effective operational system.

Each step of the acceptance tests will be fully documented and signed-off by BPNG to signify acceptance of each element.

7.5.3 Location of Acceptance Tests

1. Initial acceptance tests will be performed using the system installed at BPNG. These tests will confirm general functioning of each element of the entire system, together with any linkages within BPNG, particularly: (i) the linkage between the ATS and GSS components; and (ii) the interface to BPNG's General Ledger and CRMS.

2. Functional acceptance tests will be conducted across the fully installed system in both the primary and back-up processing sites, and all elements installed at participant institutions, including linkages with participants' in-house systems.
3. Operational acceptance tests will involve full load (stress) testing of the system to confirm the ability of the hardware and software (as sized by the contractor) to handle a peak workload. They will include the full range of failover procedures specified by the contractor for handling failures at either site.

7.5.4 Acceptance Test Design and Execution

The contents of all acceptance tests will be proposed by the contractor for BPNG's approval and planning, and modification as necessary. All acceptance tests will be carried out by BPNG operations and technical staff, and will be monitored and supported by the contractor at each step. BPNG will make management personnel and staff available to the contractor to participate actively in the acceptance test execution as an integral part of the training and knowledge transfer and eventual handover of the system to BPNG.

7.5.5 Evaluation of Acceptance Test Results

BPNG's project manager will be responsible for the final rating of all acceptance test results. At the end of each test phase the project manager will provide to the contractor either a formal letter of acceptance if the contractor has met its contractual obligations, or a statement of which obligations have not been met and must be met before acceptance can be granted.

Operational Acceptance will be achieved only after successful completion of all tests and formal acceptance of all project deliverables.

7.5.6 Fault Correction

The contractor will be responsible for correcting all faults found during acceptance testing in a timely manner so that the overall project schedule is not affected.

7.6 Knowledge Transfer and Training

7.6.1 Knowledge Transfer

BPNG considers training and knowledge transfer to be among the most important factors for the success of the IPPS project. An important objective is therefore to ensure effective transfer of payment systems and related technological knowledge, not just at BPNG, but also among the participant organisations. This is viewed as critical in order for all parties to become self-sufficient in the operation and maintenance of the new services and related technologies. Proposers must describe in detail how they intend to achieve a high degree of knowledge transfer.

7.6.2 Training

Proposals must include training plans showing, for each system element to be supplied, and for the project overall, all proposed training modules, the recommended number and (if applicable) prior knowledge of people to be trained in

each institution, the duration of each training module and the proposed number of times each module is proposed to be delivered.

Training plans should specify any prerequisites that must be satisfied prior to the commencement of training. They should cover not only BPNG but all affected organisations as applicable to each part of the IPPS.

Training should include specific modules for:

1. Management level personnel for both BPNG and participants;
2. Supervisory and operational staff for both BPNG and participants;
3. Audit staff;
4. Technical training for systems development and testing staff in both BPNG and participant institutions;
5. Technical training for systems operations and maintenance staff in both BPNG and participant institutions;
6. Training in the creation of reports, and in the use of a report writer as applicable;
7. Any other relevant training for users.

7.7 Documentation

Proposed project plans must contain detailed specifications of the documentation which the proposer intends to provide, indicating for each item: (i) on which medium or media it will be supplied; and (ii) whether it is a standard document or it will be tailored to the specific context of the PNG system. BPNG expects that the supplied documentation will include at least the following:

1. **Product Literature**, describing the different system components that address the business and technical requirements of this procurement;
2. **End-user Documentation**, tailored as applicable, covering operations guides, operating manuals, and standard user manuals. On-line help must be provided in all system modules;
3. **Technical Documentation** that BPNG will need to use for the safe and effective running of the processing environment. This should include 'as-built' and final design documentation that includes the selected options and configuration settings, and all operating instructions and procedures;
4. **Detailed Documentation of Operational Processes.**

7.8 Warranty

The contractor will be required to provide operational support for the entire system on-site at the primary and alternate processing sites during the implementation period and for a period of at least one month after Operational Acceptance.

Following Operational Acceptance, the contractor will provide support for the IPPS at no charge for a period of one year (the System Warranty Period). After this period, support will be provided under a Service Level Agreement.

There will be no warranty or support requirement for hardware, which BPNG will procure itself.

7.9 Ongoing Support

During the installation and acceptance testing phase, the contractor's support personnel should be available on an immediate on-call basis during normal business hours in Port Moresby.

On Operational Acceptance the contractor will establish a single point of contact for all software or support related problems. The contact point will be available throughout the system operational day, which will be agreed between BPNG and the contractor during implementation. Terms for out of hours support will also be agreed upon during this period. Proposals should include details of how the proposer will provide the required level of ongoing support.

7.9.1 BPNG Help-desk

The contractor will be required to assist BPNG in establishing a help-desk service to provide application-level support to all users during the operating day. Proposals should contain recommendations for establishment and operation of the help-desk service, including staffing levels, training, documentation, operating procedures and so on.

7.9.2 Upgrades

Proposers should describe their methodology for supplying and implementing system upgrades during the life of the system, ensuring that full training is provided on changes and enhancements as needed, and that business continuity is guaranteed during upgrades, additions or changes.

7.9.3 Problem Management

Details of problems logged with the contractor, whether during the project, the System Warranty Period or under an ongoing Service Level Agreement, should be easy for BPNG to follow up. Regular reporting should be a standard feature of the system and should include:

1. The number of service-disrupting incidents over any selected period by source of disruption and in total;
2. The number of non-service disrupting incidents reported over any selected period;
3. The time taken to restore normal service after each recorded service disruption.

Proposers should also explain how BPNG staff can monitor reported problems on a regular basis.

7.9.4 Service Level Agreement

BPNG expects a very high level of reliability and availability of all its systems, and the IPPS will be particularly crucial in this respect. As previously specified, the system

will operate in two-site mode, which is expected to assure very high reliability and availability levels.

BPNG will conclude a Service Level Agreement (SLA) with the contractor for the ongoing operation of the system. BPNG's expectations for the SLA include:

1. There will be no more than a total of three software failures per annum, and no more than one in any single month. A software failure is defined as an event where a component of the application fails to respond to operator instructions and fails to perform its normal function, and requires to be manually restarted or fails to restart. In every case the time to recover from a failure shall be no more than 30 minutes.
2. In a situation where the system performance is degraded, this must not delay end of day processing by more than 30 minutes. There will be no more than one such incident per month or three per year.
3. BPNG's general availability expectation for this system is 99.95% (where downtime is defined as total unavailability of the system). Proposers are requested to give details of expected reliability and availability figures for the actual configuration (hardware, software etc.) they are proposing.

Proposals should include sample SLAs based on the above points.

8. Instructions to Proposers

8.1 *Conditions of this RFP*

- Proposals must be in the format, and follow the sequence, specified in section 8.3 of this RFP. BPNG reserves the right to exclude from consideration any proposal which fails to do so.
- Each proposal must be signed by a duly authorised officer of the proposer.
- Each proposal must name the person(s) authorised to negotiate and answer any questions regarding the proposal, and state their designation(s) together with contact details including physical and email addresses, telephone and fax numbers.
- BPNG shall be entitled to rely on all statements and representations or subsequent enquiries or correspondence made by the proposer in response to this RFP, whether made orally or in writing.
- BPNG wishes to procure all systems as a single lot. Part-bids will not be considered.
- BPNG wishes to enter into a contract with one party only. However, it is acceptable for proposers to combine with other companies for the supply of different elements of their solutions provided that in each case the proposer (prime contractor) accepts full responsibility for the successful execution of the entire project.
- Proposals must indicate all parties concerned with, or contributing to, the proposal including any subcontract or similar arrangements.
- The lowest priced or any proposal will not necessarily be accepted. BPNG shall not be under any obligation to discuss the reason why any proposal is accepted or rejected.
- The acceptance of a proposal shall not operate to create any contractual relationship between BPNG and the concerned proposer, but shall represent a commitment to enter into negotiations in good faith.
- No proposal shall be deemed to have been accepted or rejected until such acceptance or rejection has been notified in writing by BPNG.
- Unless otherwise expressly agreed, there shall be no binding contract between the successful proposer and BPNG unless and until a written contract is executed by BPNG.
- The requirements specified in this RFP reflect those known at present. BPNG reserves the right to vary the final requirements prior to entering into any contract.
- BPNG will not be responsible, nor pay, for any expense incurred by a proposer in the preparation of their proposal or in BPNG's evaluation of it.

- All documentation submitted and statements made as part of, or in connection with, the successful proposal will be carried forward as part of the contract.
- The contents of this RFP are confidential to BPNG and shall be used by the recipient for the sole purpose of preparing a proposal. No information regarding this RFP is to be divulged to any third party without the written approval of BPNG. Any authorised third party is to be similarly constrained.
- BPNG will treat all information contained in a proposer’s response, and any subsequent information, as commercially confidential and will not disclose it to any third party, except for BPNG’s consultants engaged specifically in connection with this RFP, without specific written authority. BPNG will agree to be bound by a proposer’s reasonable non-disclosure agreement related to specific items of information, provided such agreement is made in writing.
- This RFP and any contract arising from it shall be construed according to and governed by the law of Papua New Guinea and proposers agree to submit to the exclusive jurisdiction of the Papua New Guinea courts in any dispute or difference of any kind which may arise concerning this RFP or any related contract.
- No advertising, press release or any other information relating to the acceptance of any proposal shall be published in any newspaper, magazine, journal or other medium without the prior consent of BPNG.

8.2 Proposer Qualifications

Proposers must establish to BPNG’s satisfaction that they have the financial, business, technical, and production capability necessary to perform the contract, and have a successful performance history. In particular proposals must meet the following qualification criteria:

- During the past four years, the proposer must have completed at least one successful contract involving the supply, implementation and support of an Automated Transfer System of similar specification to that contained in this RFP and preferably in a similar environment to PNG;
- The ATS should preferably be already installed and operational, or under implementation, as an integrated functional unit with a Government Securities System in at least one country, preferably in a similar environment to PNG;
- Bids must be for packaged software. BPNG does not wish to undertake systems development (although it is appreciated that some minor amount of associated bespoke software development may need to be carried out);
- The software must be fully developed. BPNG expects that the full functionality including integration will be demonstrated as part of the proposal evaluation process;
- The proposer must have on its current staff at least one key person, who will be assigned to this project, in each of the following specialist areas involved in the project:
 - High value/high priority payment processing systems (RTGS);

- Low value and bulk (retail) payment processing systems;
- Government securities depository and settlement applications;
- Systems integration;
- Information and Communications Technologies (ICT);
- Training of non-technical end-users.

Each key person should meet the following minimum requirements:

- Ten years of relevant experience, with the last five years in the particular specialist area;
- The last three years of industry experience in a management/team leadership capacity.

The project manager nominated by the proposer should have at least ten years relevant industry experience, the last five of which should have included project management responsibility for staff over extended periods involving the development, implementation, operation and support of integrated banking and payment systems.

8.3 Structure of Proposals

Proposals must be structured as specified below.

8.3.1 Executive Summary

A concise summary of the entire proposal which must include as a minimum:

- An overview of the total solution proposed, including all proposed and future potential linkages, and describing the benefits to BPNG of each part of the solution;
- A description of all proposed products and services, including software, hardware, project management, business consulting services, software customisation, implementation, testing, documentation, training and ongoing support for both software and hardware;
- A statement accepting the terms and conditions laid down in section 8.1 above;
- A written confirmation that, if awarded the contract, the proposer will accept responsibility for successful integration and interoperability of all proposed products, including interfaces to external systems.

8.3.2 Proposer Profile

A business profile of the proposer, which must include the following:

- A copy of the audited financial statements for the last available two years;
- Organisational history and structure, including number of years in operation, and location of relevant sites/offices, particularly indicating from which location(s) implementation services and ongoing support would be provided to BPNG;

- Number of staff – total employed and number relevant to this proposal;
- History of the proposed product(s), and future development plans;
- Details of reference sites for the proposed product(s) including a reference letter from the responsible person at each site;
- A list of current projects involving the proposed products, including status of implementation, expected completion date and key personnel assigned;
- The above information for each company associated with the proposer in this proposal (subcontractors, product suppliers, consulting firms, etc).

8.3.3 Proposed Solution

This section should provide complete information on all aspects of the proposed solution, structured as follows:

- An overview of the full solution, describing each element and how all elements are proposed to interact and link to other external systems as specified in this RFP.
- An item-by-item response to the detailed requirements as set down in sections 4 to 6 of this RFP (it is not necessary to provide a detailed response to section 3). Proposers are requested to use the *Table of Required Features* which can be found as Attachment 1 at the end of this RFP. For each item, a description must be given of how the proposer’s product satisfies the requirement: for example, “yes” or “complies” are not sufficient. Where alternative options exist to satisfy any individual requirement, these should be clearly identified, together with any recommendations that the vendor may wish to make regarding them. Should a proposed product be incapable of satisfying any individual requirement, this should be clearly stated, together with proposals for mitigating such shortfall (e.g. development of custom software module).
- Related and relevant technical literature on the proposed products and services should be included as appendices to the proposal and clearly cross-referenced from the main body of the proposal as necessary.

8.3.4 Services

This section of the proposal must contain clear and detailed responses to the requirements for implementation and support services as specified, and in the same sequence as, in section 7 of this RFP.

8.4 Procurement process

8.4.1 Technical Proposal Submission and Opening

Proposal submission

Technical proposals (without prices) in response to this RFP must be submitted as follows:

- Proposals must be in the English language.

- Three hard copies plus one electronic copy of each proposal must be delivered by 4.00 p.m. PNG time on 25 February 2011 to:
Bank of Papua New Guinea
To Robert Haus
Douglas Street
P.O. Box 121
Port Moresby
Papua New Guinea
- All copies of each proposal should be submitted in a sealed package clearly marked “**For the Attention of Mr. Robert Kule: Proposal for Integrated Payments Processing System**”.
- BPNG will send by email acknowledgement of receipt of all proposals submitted by the above deadline within one week of the deadline.

Clarification

All requests for further information or clarification of these requirements must be in writing and should be directed by email to:

Mr. Robert Kule (rkule@bankpng.gov.pg)
c.c. Mr. Andrew Mason (andrew@knowledge.co.nz)

Each such request and BPNG’s response will be emailed to all prospective proposers prior to closing date (without identifying the source of the queries).

After opening, proposals will be checked for conformity with the qualification criteria specified in 8.2. BPNG, at its discretion, may exclude from further consideration any proposals which do not meet these criteria. All other proposals will be subjected to evaluation as described in the following paragraphs.

8.4.2 Evaluation of Proposals

The evaluation process will take place in three stages:

1. First, technical proposals will be subjected to an initial technical evaluation against the criteria given in 8.4.5. The proposal presentation meetings as described in 8.4.3 will be conducted during this period.
2. Second, following submission of final proposals as prescribed in 8.4.4, technical proposals will be formally evaluated (with possible modifications of the evaluation criteria in light of proposal presentation meetings, of which proposers will be notified).
3. Third, financial proposals will be opened and evaluated. Total five-year costs will be used in the financial evaluation.

As part of the technical evaluation BPNG will undertake site visits and reference checks to gather information about each proposed solution’s capabilities and limitations during live operations.

8.4.3 Proposal Presentation Meetings

During the initial technical evaluation process proposers will be invited to attend proposal presentation meetings with BPNG's steering committee for the NPS development programme and stakeholder representatives. The objective of these meetings will be for BPNG, its advisers and other relevant bodies to gain a thorough understanding of each proposer's capabilities, software functionality and comprehension of BPNG's detailed requirements. Proposers will be asked, not merely to present and demonstrate their capabilities and software, but to conduct a realistic workshop during which BPNG will be able to operate all elements of the proposed solution. BPNG will also discuss with proposers the detailed design of their solutions and agree with them the elements of their final proposals.

The outline agenda for each meeting is therefore as follows:

1. Brief introduction by BPNG. The purpose of this session is to ensure a common understanding of BPNG's requirements, and of the objective(s) of the meeting.
2. Presentation by the proposer of its proposal. This can include brief information on the proposer's operations and capabilities, etc.
3. Demonstration of the proposed solution including options and variations. This will also be used to address any questions which BPNG may have formulated following initial evaluation of the proposal as delivered. If possible these questions will be forwarded to proposers prior to the presentation meetings.
4. Hands-on detailed operation of all elements of the proposed solution by BPNG, under the advice and supervision of the proposer.
5. Discussion with the proposer of matters arising out of the preceding sessions. At the end of this session BPNG expects to have reached agreement with the proposer as to the final form of the proposal.

The proposal presentation meetings are expected to take place during the period 7 to 18 March 2011 at BPNG's head office in Port Moresby. Proposers who have indicated their intention to submit proposals will be consulted as to their preference for date(s) prior to the closing date for proposal submission.

8.4.4 Preparation of Final Proposals

Following the proposal presentation meetings, any proposals which have been found during the initial technical evaluation process to be substantially non-responsive to BPNG's technical requirements will be excluded from further consideration, and their proposers will be notified to this effect.

BPNG will draw up proposer-specific letters which will be sent to the other proposers, inviting them to submit:

1. **Updated Technical Proposals**. These will contain revisions of the previously-submitted proposals as applicable in light of discussions held during the proposal presentation meetings. It will not be necessary to re-submit the original proposals.

2. **Financial Proposals**. These must contain a detailed description and breakdown of all costs associated with the proposed products and services, clearly distinguishing between one-time and recurrent (post-System Warranty Period) costs. They must be structured as follows:

One-time costs

- a. Software – itemised for each discrete product;
- b. Project management;
- c. Business level consultancy and requirements specification;
- d. Tailoring and customisation of software and system integration;
- e. Implementation and testing (including participant sites);
- f. Documentation;
- g. Training;
- h. Any other costs.

Recurrent Costs

- a. Annual licence and support costs for four years following the System Warranty Period (i.e. years 2-5 after Operational Acceptance);
- b. Any other recurrent costs.

8.4.5 Evaluation Criteria

Each proposal will be evaluated on a number of criteria, which will include:

1. Proposer’s demonstrated understanding of the PNG context, in particular national economic development prospects, BPNG’s strategic direction and the national payments system development programme.
2. Functionality – match to BPNG’s requirements:
 - ATS component*
 - [GSS component]*
 - Usability*
3. Technical quality of solution:
 - Integration of components*
 - Linkages to other systems*
 - Adaptability to future requirements*
 - Integration with BPNG’s IT environment*
4. Services and support:
 - Approach and methodology*
 - Project plan*
 - Implementation time-frame*
 - Provision of business-level consulting*
 - Experience of key staff*

Track record in similar implementations
Support arrangements

8.5 Contract

Proposals should include any contractual documents that the proposer wishes to put forward as appropriate to this procurement. BPNG reserves the right to use its own form of contract or to negotiate on the basis of the proposer's contract documentation at its own discretion.

8.6 Timetable

The following table gives the currently-planned timetable for the IPPS project. **The dates in the table are current best estimates, but may be altered according to circumstances.**

Closing date for submission of technical proposals	25 February 2011
Proposal evaluation, including presentation meetings	7 to 18 March 2011
Closing date for submission of revised technical and financial proposals	15 April 2011
Selection of preferred supplier	13 May 2011
Conclusion of supply contract	1 June 2011
Contractor mobilisation in PNG	No later than 4 July 2011
ATS live	30 July 2012

ATTACHMENT 1: Table of Required Features

Priority Key:

M – Mandatory Requirement

H – No mandatory requirement, High priority

L - No mandatory requirement, Low priority

4. Common System Requirements

Required Feature	Priority	Bidder's Response
4.1 Principles: All software components should be based on best international practice and be consistent with the following principles:	--	
1. Have a high level of usability with a common “look and feel” achieved through a standard graphical user interface (GUI);	M	
2. Comply with industry standard conventions and interfaces which allow the system to be interfaced easily with other systems, and/or expanded by either functional module or capacity;	M	
3. Offer low cost and easily implemented technical connections for external participant sites on either a remote terminal or host-to-host basis for all system traffic;	M	
4. Enable BPNG system operators easily to add, remove or suspend participants;		
5. As appropriate, permit optimum use to be made of any equipment that is already installed in both BPNG and participant organisations;	M	
6. Provide full audit trails for all activities within the system, including system accesses and messages sent and received;	M	

Required Feature	Priority	Bidder's Response
7. Have high levels of trustworthiness with particular emphasis on data integrity and security, particularly preventing unauthorised access and assuring 100% data accuracy;	M	
8. Have very high levels of service availability which will be assured through demonstration, rigorous testing and a robust Service Level Agreement;	M	
9. Offer automation of daily processing with full exception and summary control reports for both BPNG and participants;	M	
10. Provide comprehensive event and problem management tools	M	
11. Be configured such as to process the expected workload in terms of throughput capacity and response times, making due allowance for peaks in transaction volumes and general growth in transaction volumes.	M	
4.2 Operational. As applicable, the system should:	--	
1. Allow for easy customisation through on-screen parameters to accommodate new, changed or modified rules that will govern various functions e.g. create a new message type, create a new instrument type, etc.;	H	
2. Allow authorised personnel to change the business process flow through the setting of parameters in process control tables;	H	
3. Provide online access to and reporting of historical records – covering a period of at least five (5) years – without compromising response times;	M	
4. Provide online, context sensitive help for all user and operator functions;	M	
5. Enable automation of daily processing including initiating links to directly interfaced systems with appropriate security procedures and exception and summary control reports;	M	

Required Feature	Priority	Bidder's Response
6. Be operationally resilient, with high levels of local recovery supported by an appropriately configured back-up installation and a smooth cut-over between the primary and alternate sites, and back again to the primary site when service is recovered.	M	
4.3 Integrity. The system should provide:	--	
1. Financial integrity checks to ensure that 'value in = value out' at all times and that the ATS component can be reconciled to a zero net balance at any time;	M	
2. Message processing integrity checks to ensure that the total nominal value of all instruments in all recorded portfolios is matched, and reconciles with the control totals for all issues registered;	M	
3. Processing integrity checks to ensure that 'number of financial items in = number of financial items out' at all times and that each processing site can be reconciled to a 'no missing items' position at any time;	M	
4. Consistent and regular reporting for financial processing, security logs, calculated settlement positions, gross and net settlement values, batch and file numbers processed etc. which can be reported both locally and centrally to prove system integrity and complete system-wide reconciliation;	M	
5. Local record of all messages sent, pending and received each day;	M	
6. Encryption of all data flows;	M	
7. End-of-day audit and activity reporting;	M	
8. Local recovery capabilities;	M	
9. Security of messages with a high level of message authentication, data integrity, and confidentiality;	M	
10.A very high level of availability and reliability;	M	

Required Feature	Priority	Bidder's Response
11. Guarantee of no data loss either in transmission or after a failure.	M	
System management functions must be fully integrated. For example, setting any parameter that may be applicable to all system components must be set only once. All system information moving between components must be transparent to system operations.	M	
4.4 Transaction and File Processing Controls. Incoming transactions and files must be checked for at least the following:	--	
1. That the type and format are correct;	M	
2. That the source is authorised;	M	
3. That the identification, date and, for files, control totals are correct;	M	
4. That a message is not a duplicate;	M	
Outgoing transactions and files must be checked at least as follows:	--	
1. It must be assured that no transaction or file will be left undelivered;	M	
2. If delivery is not possible, alerts must be available;	M	
3. It must not be possible to deliver twice, except under recovery procedures when both parties are made aware of the possibility that the message may be a duplicate.	M	
4.5 Validation Controls must include:	--	
1. Validation of batches and individual payment instructions, of all types;	M	
2. Validation of mandatory and optionally other fields within funds settlement instructions;	M	
3. Authentication of message sender;	M	

Required Feature	Priority	Bidder's Response
4. Confirmation of message traffic and validity to the sender;	M	
5. Flexible and tailorable validation routines	M	
Proposals should describe validation options offered by their proposed solution and the extent to which these can be tailored by BPNG, and also discuss the processing overhead that validation controls may impose on the system in a high-volume environment..	M	
4.6 Message Integrity and Accountability. The controls must include the following:	--	
1. Each registration of change instruction or payment instruction, and files containing such instructions, must be uniquely identified with its physical source, user identification and date and time of entry into the system;	M	
2. Each instruction must be executed according to the single or multiple levels of authorisation (two-eyes or four-eyes) prescribed by the administrator and/or the participants;	M	
3. A message sequence numbering scheme and control procedure must be implemented to ensure there is no loss, duplication or unauthorised insertion of messages;	M	
4. Non-repudiation is required for all participant messages;	M	
5. Application level message acknowledgment is required as a mandatory component of all message handling;	M	
6. Where an operator has the ability to make any change to any message (e.g. value messages or messages that contain instructions for making payments or transferring securities) or critical system parameters, the system must allow for multiple authorisations;	M	
7. It must be possible for operational management automatically to trace any	M	

Required Feature	Priority	Bidder's Response
transaction from the point of entry into the system up to the delivery to the final destination with complete information about the time the message was received and delivered, and the processing which occurred at each step at each location handling the transaction/file. Information for this purpose must be kept on line for up to a number of days which can be defined by BPNG, after which time the data should be archived to permanent off-line storage;		
8. It should be possible to suspend processing of elements of the system (for example selected payment queues or streams) in the course of the business day and resume operation without the loss or duplication of messages;	M	
9. In the case of failure leading to unavailability of the primary site, the resumption of service at the alternate site should be completed within a maximum time of ten minutes with minimum user intervention.	M	
4.7 System Operation;	--	
1. To minimise the opportunity for human error to cause service disruptions, operation of the software should be automated as far as possible, with controls to assure successful completion of each job as a condition for initiation of subsequent job sequences;	M	
2. The software should offer a consistent graphical user interface (GUI) to enable BPNG to control its overall operation. This should provide a comprehensive range of user-definable parameters which should be fully described in proposals;	M	
3. To assist in the execution of monetary policy, the system should be able to show on-line to BPNG short summaries of the overall liquidity situation of the system, both stand-alone and compared to previous situations (hours, days, and weeks);	M	

Required Feature	Priority	Bidder's Response
4. All aspects of the system must be controlled via a single GUI;	M	
5. Technical management requirements must be kept to a minimum. It is especially important that all error messages be simply displayed and easy for operational staff to understand and react to;	M	
6. The system should require minimum (preferably no) intervention by IT technical staff for normal operations including start-up, daily operations and shut-down;	M	
7. The system should provide a range of alarms and alerts with options for: <ul style="list-style-type: none"> a. Different alert levels (e.g. critical, serious, information-only); b. The nature of alarms available (e.g. flashing message at an operator workstation, audible warning, email message, SMS message to a mobile phone); c. Recipients of alerts (e.g. operations staff in BPNG Payment Systems department, participant bank end-users, BPNG operations, BPNG accounting department, BPNG treasurers, etc.); 	M	
8. Certification measures will take place using the test environment that is to be established as part of this procurement. They should be carried out using a standard set of test messages that will be developed as part of the overall system implementation and should include: <ul style="list-style-type: none"> a. Testing and certifying new software releases/upgrades prior to use; b. Testing and certifying new system participants in respect to hardware, software, communications and procedures. 	M	
4.8 Enquiry and Reporting: The IPPS will provide comprehensive reporting and	--	

Required Feature	Priority	Bidder's Response
<p>on-line enquiry facilities allowing all participants to make a broad range of requests for the purpose of monitoring their positions, tuning system functionality, managing intra-day liquidity, queue management of payment requests and so on.</p>		
<p>4.8.1 Reports</p> <p>Proposals must contain a full list of all standard enquiries and reports available in the proposed ATS package(s), for all types of users. They must also include a representative sample (listings and screen-shots) of enquiries and reports sufficient for BPNG to gain a good understanding of what is provided. These samples should demonstrate comprehensibility, usability and comprehensiveness of the information contained in enquiry screens and reports.</p> <p>Proposals should contain details of: (i) how BPNG staff can tailor/customise standard reports if desired; (ii) proposed report-writing tools for the development of further (non-standard or <i>ad hoc</i>) reports; and (iii) proposed training/knowledge transfer to ensure that BPNG staff are able to undertake future report development.</p>	M	
<p>4.8.2 Dashboard</p> <p>BPNG wishes to implement a consolidated display capability ('dashboard') to support system operations staff in managing the overall IPPS. This would use a large monitor positioned centrally in the operations area to provide BPNG staff with a view of the overall status of all critical and important elements of the system. Proposers should describe how their system supports this concept, with recommendations as to the data items that would be displayed.</p>	M	
<p>4.9 Security</p>	--	
<p>4.9.1 Monitoring and Measurement</p>	--	

Required Feature	Priority	Bidder's Response
1. All accesses to the system, transactions handled by the system and changes affecting access controls, system parameters, directories and similar control and integrity functions should be logged and reported to BPNG operators, and be accessible for authorised retrieval and analysis, on a daily basis. It must not be possible to alter in any way the contents of any audit log;	M	
2. The following information must be provided: <ul style="list-style-type: none"> a. Control totals for a day's processing in a location; b. Management of all system users (from both BPNG and other participants) and their access privileges; c. Invalid access attempts at workstations; d. The number, frequency and source of invalid transactions and files; e. Any unusual behaviour patterns by an authorised user, indicating increased risk and/or attempted fraud. 	M	
4.9.2 Access Controls	--	
1. Access to all parts of the system must be restricted to authorised personnel or systems by means of strong system, device and user authentication. User authentication capabilities should include two-factor authentication;	M	
2. The system should support a hierarchical user structure, such that at each participant (and also in BPNG's operational area) there can be a local administrator with certain additional rights (e.g. for password reset);	M	
3. Separation of duties must be strictly enforceable for all sensitive programs and functions;	M	
4. All accesses must be logged to include system or physical device identification, user identification and the time of each access in order to	M	

Required Feature	Priority	Bidder's Response
provide a clear audit trail for review in case of accidental or deliberate violation of security controls;		
5. The system start-of-day procedures should include the initiation of directly interfaced systems and confirmation of the authenticity of each interfaced system;	M	
6. Users should not be able to see menu options for those functions they are not authorised to use;	M	
7. The system must enforce sound password management. That includes: enforcing the use of 'strong' passwords; forced expiry of passwords at parameter-defined intervals; disablement of accounts after a parameter-defined number of unsuccessful log-in attempts; and not permitting the re-use of a parameter-defined number of previously used passwords;	M	
8. Application workstations must be logged off automatically if idle for more than a specified – but variable – period, to prevent access by unauthorised third parties if left unattended.	M	
Fail-Safe Operation	--	
1. The system must provide the highest level of availability. The system should therefore be configured such as to be able to recover from any single failure automatically, and with no interruption in service;	M	
2. In any case, the system must be able to complete processing of all transactions for the day within a maximum of two hours after normal close of day.	M	
4.10 Processing Requirements	--	
BPNG requires the highest level of performance, availability and reliability from the system. The system will therefore be implemented to run at two sites. A further copy of the system for test and training will also be run at the primary	M	

Required Feature	Priority	Bidder’s Response
<p>site. In addition, BPNG will regularly copy all data to back-up media daily, weekly and monthly and store it at an off-site location.</p>		
<p>4.10.1 Operational Resilience</p>	<p>--</p>	
<p>All system elements must be designed and configured to provide a very high levels of reliability, resilience and availability. The system at the primary processing site should keep the system at the alternate site updated (and vice versa) so that, in the event of a failure at one site, the other site is able to continue processing with minimal manual intervention.</p> <p>Proposers should address these requirements carefully, and make appropriate recommendations for achieving the highest level of performance and reliability. Proposals should contain a detailed specification of all proposed hardware, software and any other necessary components to achieve the required levels of reliability and switchover times. They should also include a discussion of worst-case scenarios requiring a complete switch-over from the primary to alternate site.</p>	<p>M</p>	
<p>4.10.2 Test Environment. A test environment should be available at all times to allow for testing of planned system changes, or for participant interface testing.</p>	<p>--</p>	
<p>Proposers should describe how they will accomplish the following main tasks:</p> <ol style="list-style-type: none"> 1. Management of changes involving hardware, system software and application software, covering all participants; 2. Operation of the above system components; 3. Testing of parameter-level changes made by the system operator. 	<p>M</p>	

Required Feature	Priority	Bidder's Response
It is expected that the initial system implementation will follow this process.		
4.11 Operational Requirements	--	
4.11.1 Daily Processing Cycle	--	
BPNG will publish an annual schedule giving the daily processing cycle for IPPS. The timing and duration of different processing windows will be agreed between BPNG and participants.	M	
The system operating hours will be flexible and capable of adjustment to cater for abnormal circumstances.	M	
For certain classes of payments (queues) it must be possible to suspend daily operation and restart on another day while retaining the same value date.	M	
4.11.2 Start/End of Day	--	
With the exception of security provisions, any procedures related to the start/end of day activity should be handled automatically.	M	
4.11.3 Performance Monitoring	--	
<p>The performance of all components of the system will be monitored on an ongoing basis, and relevant exception reports will be produced with suitable highlights whenever system performance falls outside accepted performance standards. Proposals should include details of proposers' recommendations covering at least the following:</p> <ol style="list-style-type: none"> 1. A performance monitoring system, including an events monitor integrated with the dashboard described in 4.8.2, which depicts critical operational and security events including the operational status of all authorised users and attempts to access the system by unauthorised 	M	

Required Feature	Priority	Bidder’s Response
<p>users;</p> <p>2. Introduction of a reporting system which can be used to monitor the quality of the service and provide appropriate tailored information to all participants.</p>		
<p>Proposers should describe how the different measures should be monitored and, where appropriate, also give an indication of the levels of performance they typically expect to achieve. The measures should include the following:</p> <p><u>System Availability</u></p> <p>The System Availability measure should capture the percentage of normal business hours in which each system component is delivering service to participants regardless of the source of any service disruption e.g. hardware, software, network, power, human error.</p> <p><u>Message throughput</u></p> <p>Message throughput should be monitored and reported against at least the following parameters:</p> <ol style="list-style-type: none"> 1. The number and value of messages per day by payment type, stream (queue) and participant and in total; 2. The number and value of messages processed during the peak hour; 3. Average time in queue of messages by queue, by participant and in total per day. <p>Proposals should describe all available tools to collect and maintain statistics for both BPNG and participants.</p>	M	
<p>4.11.4 Operational Rules and Procedures</p>	--	

Required Feature	Priority	Bidder's Response
Proposers will be expected to advise and assist BPNG in developing and implementing rules and procedures for operation of the system. This must include provision of suitable sample documents which BPNG can adapt.	M	
4.12 Billing Information	--	
<p>The system must include a flexible billing mechanism which will automatically calculate fees for each participant, and which should have the following functionality:</p> <p>The billing system should have the following functionality:</p> <ol style="list-style-type: none"> 1. Enable fixed periodic charges (e.g. annual or monthly membership fees) to be levied; 2. Calculate usage fees based on message or instruction type; 3. Apply value modifiers by message during time bands during the day; 4. Apply value modifiers for different payment streams (queues); 5. Apply value modifiers for volumes of transactions; 6. Allow for different charges according to participant; 7. Apply charges directly, with no manual intervention other than authorising the transaction; 8. Automatically create invoices to be sent to all direct participants as well as those without settlement accounts at BPNG, such as indirect participants. <p>Proposers should fully explain the options and capabilities of the charging and billing functionality, including the automatic generation of relevant payment messages. The successful proposer will be expected to advise and assist BPNG in developing and implementing a suitable pricing and billing policy.</p>	M	

Required Feature	Priority	Bidder's Response
4.13 Hardware, Software and Communications. The system will run on dedicated hardware to be installed both in a primary site at BPNG's head office and in a yet-to-be-established alternate site, as follows:	--	
1. The live system will be installed on servers installed at both sites. The equipment at each site should be sufficient to run the entire system should the other site become unavailable, but in normal operation BPNG expects that the systems at the two sites will be coupled in such a way that a failure of any single server (for example) will have no effect on the operation of the system. Proposals must contain recommendations as to how the two sites will be equipped and coupled to enable the highest level of availability.	M	
2. Proposals should also contain details of how suitable failover procedures will be developed and tested to allow for situations of multiple failures or complete unavailability of one site.	M	
3. A test and training system will be installed at the central site. This will be used as required for testing of changes to the software, training of staff, etc.	M	
BPNG intends to procure the required hardware and associated components itself, according to the recommendations which will be agreed with the successful proposer. Proposals must therefore give full details of all recommended hardware, system software, middleware and any other products and equipment necessary to run the system. All items must be compatible with BPNG's existing ICT infrastructure as described in 2.7.1.	M	

Required Feature	Priority	Bidder's Response
After contract signature, BPNG's IT Department will agree with the successful proposer the final specification of all items and an installation timetable to match the agreed project plan. The successful proposer will be required to provide contractual assurances that the agreed total configuration (hardware, networking and software) will support the IPPS in processing expected workloads for at least three years after acceptance.	M	

Required Feature	Priority	Bidder’s Response
<p>4.13.1 Hardware</p> <p>Proposers must specify full details of all hardware elements recommended to operate their proposed solution. Th should include details of any hardware that may need to be installed by participating organisations.</p> <p>All components of the system will be required to operate without a need for upgrade for a period of at least three years from operational acceptance and the hardware should be sized accordingly. Hardware recommendations should include all related services and should cover (as applicable):</p> <p><u>Servers</u></p> <p>Proposals must specify in detail all recommended server components, together with any items necessary for connection to BPNG’s existing ICT environment:</p> <p><u>Application and data servers</u> should be based on either IBM hardware running AIX or IBM or HP hardware running Red Hat Linux. If both options are available, they should both be included in the proposal.</p> <p><u>Other servers</u> (web, certificate, directory, etc. as necessary) should be based on IBM or HP hardware with recommendations as to operating system(s).</p> <p><u>Data Storage</u></p> <p>Proposals must specify in detail the recommended data storage capacity and equipment. This should be support by sizing information on the capacity required to hold all copies of the system database(s) and any other supporting data, based on the current and forecast volumes given in this RFP. Proposals should allow for the last five plus current years’ data to be held in the on-line database and up to ten years’ data on a secondary database. These requirements will be discussed in more detail with the successful proposer.</p> <p><u>Workstations</u></p> <p>BPNG expects that the system will use existing PCs as user application workstations. Proposers should specify both minimum and optimum configurations required but should not propose any workstation PCs.</p>	<p>M</p>	
<p><u>Other Hardware</u></p> <p>Proposals should include details of any other hardware required by their solution.</p>	<p>IN CONFIDENCE</p>	<p>Page 97</p>

Required Feature	Priority	Bidder's Response
4.13.2 Software	--	
<p><u>Participant Software</u></p> <p>In addition to software required at BPNG, proposers must specify in detail all software products (required and optional) that may need to be installed by each participating organisation, including requirements for Straight Through Processing.</p>	M	
<p><u>System Software and Middleware</u></p> <p>In addition to server operating system(s), proposals should clearly specify in detail any other system software and middleware items that will be required to run the IPPS.</p>	M	
<p><u>Database Software</u></p> <p>Proposers must confirm that their proposed IPPS solution will run on BPNG's chosen RDBMS (Oracle version 10i), and specify the nature and number of Oracle licences that BPNG will need to order.</p> <p>Proposers should provide a description of any special facilities of the database management software which are utilised by their application, for example automatic database replication to facilitate high availability.</p>	M	
<p><u>Report Writer</u></p> <p>Proposals should describe standard easy-to-use database report generation tools that can be used for the rapid development of reports to satisfy needs that might arise on an <i>ad hoc</i> basis.</p>	M	
4.13.3 Communications	--	

Required Feature	Priority	Bidder's Response
Proposers should specify in detail all communications requirements for their solutions, covering both BPNG (both processing locations) and all participating organisations, including performance, security, reliability, backup capability, bandwidth and any other relevant considerations.	M	

5. Specific Functional Requirements for the Automated Transfer System

Required Feature	Priority	Bidder’s Response
<p>The Automated Transfer System (ATS) will provide for the submission, processing and settlement of all inter-bank payments, both large and small. There will be no defined value limit (upper or lower) for payments accepted for processing.</p>	<p>--</p>	
<p>5.1 Objectives The objectives of the ATS are to:</p> <ol style="list-style-type: none"> 1. Provide efficient and cost-effective clearing and settlement capabilities for all interbank payments, with the ability to handle significant future growth in volumes of payments; 2. Achieve real-time settlement of payments between its participants in the books of BPNG to deliver irrevocability and finality of payments; 3. Provide facilities to increase the efficiency of daily liquidity management by banks through the provision of real-time settlement account information reporting and monitoring; 4. Minimise payments system risk by managing liquidity on both an individual bank basis and system-wide; 5. Improve the tools for BPNG to implement monetary policy; 6. Integrate the clearance and settlement of GPNG and BPNG securities transactions to achieve Delivery versus Payment; 7. Achieve a reliable, safe, and integrated payments and settlement system to meet the needs of a growing economy, with the ability to be extended to process new payment instruments and support new payment systems as 	<p>--</p>	

Required Feature	Priority	Bidder's Response
they may be developed.		
As previously explained, BPNG wishes to procure a modern integrated solution which is capable of clearing and settling all types of electronic instruments in a conceptually single electronic system. The ATS should contain the ability to provide different processing modalities for high value/time critical payments (to be handled by the RTGS element) and low value/retail payments (to be processed using the ACH element), but these must be integrated in such a way as to provide a single coherent user interface. Proposers should therefore describe all types of payment instruments and arrangements that their proposed solution can handle.	M	
The ATS will be closely-coupled with the GSS: (i) to ensure Delivery versus Payment (DvP) for transactions in Government and BPNG securities; and (ii) to support the process of intraday liquidity management in the ATS.	M	
<p>5.2 ACH Element – Clearing Functionality</p> <p>The ATS will handle the processing of different retail payment streams. These will include:</p> <ol style="list-style-type: none"> 1. Direct credit payment instructions, either individual or batched; 2. Files of direct debit instructions; 3. Files of electronic cheque records; 4. Bulk (one-to-many) payments; 5. Any other streams of high-volume low-priority payments. 	--	

Required Feature	Priority	Bidder's Response
5.2.1 Direct Credits Proposals must contain details of how low value (retail) direct credit payments are handled in the ACH element, whether they are submitted on an individual or batch (file) basis.	M	
5.2.2 Direct Debits The ATS will provide a true direct debit capability which may be used to replace the present BillPay arrangements as described in 2.2.5. By offering a truly interbank electronic direct debit facility, this would mean that all such payments could be initiated and processed completely automatically, without the need for customers explicitly to initiate every payment via telephone or Internet banking. It would also remove the requirement for participating companies to maintain accounts at all banks. Proposers must describe in detail how direct debits are handled in their proposed solution, and will be expected to demonstrate this in the proposal presentation meetings described in 8.4.3.	M	

Required Feature	Priority	Bidder's Response
<p>5.2.3 Cheque Processing</p> <p>As previously described (2.2.2), cheques and warrants are currently the only interbank payment instruments in use. One of BPNG's major objectives in introducing the ATS is to establish a payments processing platform that will encourage the market to adopt more efficient, more cost-effective and safer electronic instruments. BPNG expects that the use of paper warrants will dwindle rapidly once the ATS is operational, but it is recognised that cheque usage will continue into the indefinite future, albeit at a (hopefully) reducing rate.</p> <p>There is considerable interest among the banks in making the processing of cheques more efficient, which will be facilitated by the introduction of the ATS. The ACH element of the ATS must therefore contain the ability to clear files (batches) of electronic cheque records that have been captured using branch-level electronic cheque readers. Proposals should contain details and recommendations, both procedural and technical, of how the proposed ATS could handle and clear these records, including the facility to capture cheque records at bank branches.</p> <p>BPNG recognises that the introduction of any automated cheque processing capability will first of all require agreement among banks on standardisation of cheques and handling arrangements before finalising the details of the associated ATS functionality. This will be done with the involvement of, and in consultation with, the successful proposer, and so BPNG expects that financial proposals will include an allowance for the necessary consulting effort and any required software development..</p>	<p>M</p>	

Required Feature	Priority	Bidder's Response
<p>5.2.4 Bulk Payments</p> <p>The system must have the ability to provide fully automated processing of the bulk payments described in 2.2.3, which currently require a degree of manual intervention.</p> <p>Under the envisaged arrangement, participants will transmit composite payment instructions to the ATS. Each of these will contain the same information as contained in the current bulk payments, namely: (i) a schedule for a single beneficiary bank of payments (such as salaries) to be credited to one or more of its customers' accounts; and (ii) a single RTGS payment instruction for the total value of all such payments. This will replace the current arrangement whereby the schedule of individual payments is written to a CD-ROM but the actual payment instrument for the total is a cheque.</p> <p>Proposers must describe in detail how their solution will handle this requirement. It is appreciated that bulk payments can be handled in different ways, and proposers are requested to describe all the facilities offered by their solutions for the processing of bulk payments.</p>	M	
<p>5.2.5 Clearing</p> <p>Proposals must contain details of all options provided by the ACH element for clearing the foregoing streams of payments (e.g. continuous or deferred netting) and how the resulting positions are settled in the RTGS element.</p>	M	
<p>5.3 RTGS Element</p>	--	

Required Feature	Priority	Bidder's Response
<p>5.3.1 RTGS Transactions</p> <p>BPNG expects that the RTGS element of the ATS will handle settlement of the following:</p> <ol style="list-style-type: none"> 1. Transactions involving transfer of securities (both primary allocations and secondary market trades) in the GSS following the principles of DvP and STP; 2. High-value and/or high urgency bank-to-bank payments; 3. Purchase of currency by banks; 4. Net interbank positions from the ACH clearing element of the ATS; 5. Net interbank positions from the Port Moresby cheque clearing house; 6. Bilateral net interbank positions from ATM and EFTPOS transactions, and in future multilateral net positions from a national card switch (yet to be established); 7. The Kina leg of BPNG's foreign exchange transactions, via an electronic interface to BPNG's CRMS; 8. (In future) equities transactions from POMSoX. 	--	
<p>5.3.2 Settlement of GSS Transactions</p> <p>The RTGS element must have a linkage to the GSS (see section 6) for the settlement of securities transactions which will include in the first instance:</p> <ul style="list-style-type: none"> BPNG primary market operations, for government securities issues; Open Market Operations of BPNG; Intraday liquidity management and other monetary policy operations of BPNG; Settlement of secondary market transactions over Government securities. 	M	

Required Feature	Priority	Bidder's Response
For all such transactions, the principle of STP must be guaranteed. The operational interaction between the ATS and the GSS to guarantee DvP should be as described in 6.3.	M	
5.3.3 Queue Management and Processing Priorities	--	
The RTGS element of the ATS will operate on the basis of multiple payment streams or queues. Proposers should describe in detail the queuing mechanisms offered by their proposed solutions (including the maximum number of queues and queue types). Characteristics should include at a minimum:	M	
1. The system should have the capability to 'warehouse' certain types of individual transactions for execution at a forward date and time, as specified by the submitting participant..	M	
2. Queues will have different levels of priority. Participants must be able to assign priority levels to all payments submitted.	M	
3. Certain queues will operate on a "first in, first out" (FIFO) basis, unless specific gridlock resolution routines are invoked by BPNG as operator.	M	
4. The construction and operation of the queues must enable the treasurers at each participant to be reasonably sure that the payments they submit are generally processed according to the order in which they are submitted.	M	
5. Payment orders will be held in each queue by participant, in the order in which the participant despatches them and according to the priority code assigned by the participant (there will be one queue for each priority level per participant). Each participant will manage only the queues for the payments that it has issued.	M	

Required Feature	Priority	Bidder's Response
6. No lower priority transfers will be settled until all higher priority transfers are settled. The payment order at the top of the queue is settled when funds are available and only then is the next order in the queue considered for settlement..	M	
7. In order to facilitate daily liquidity management, the system should offer participants the ability to change the priority of queued payments and/or position within the queue.	M	
8. The RTGS element must be designed to avoid gridlock which could lead to systemic failure, and must contain a gridlock resolution mechanism.	M	
9. The system must provide automatic queue management or intervention facilities to BPNG at the level of analysis, with calculated solutions being offered to BPNG operators for implementation. Such facilities should include reordering, optimisation routines etc..	M	
10. Should any gridlock resolution be used either automatically or manually by BPNG, system participants should be notified.	M	
11. Each participant and BPNG must be able to enquire into the aggregated information about the total number and amount of that participant's transfers in the queues.	M	
12. The originating participant must be able to cancel a payment transaction held in the queue. A payment transaction can only be withdrawn if it has not already been settled.	M	
13. Transactions with same-day value not settled by the end of the operating day will be cancelled (with advice to the participant).	M	
5.4 Liquidity Management and Interface to BPNG General Ledger	--	

Required Feature	Priority	Bidder’s Response
<p>Liquidity management is a critical element in the efficient and effective operation of an ATS or RTGS system, and therefore BPNG intends to give significant weight to these proposed facilities and functions in the proposal evaluation process. Proposers should therefore be careful to explain their proposed liquidity management features and options (including any option for interfacing to an external Collateral Management System) in detail in their proposals, and also provide a clear demonstration and discussion of these features in the proposal presentation meetings.</p>	<p>M</p>	
<p>5.4.1 Exchange Settlement and Cash Reserve Requirement Accounts</p> <p>Each commercial bank has an Exchange Settlement Account (ESA) maintained in the books of BPNG, which is used for settlement of obligations to BPNG and other banks. In addition each bank has a Cash Reserve Requirement (CRR) account which holds the mandatory reserves.</p>	<p>--</p>	
<p><u>ESA</u></p> <p>During the operating day the ATS will hold the record of account for each ESA, while also being interfaced to BPNG’s General Ledger (GL) such that transactions on the ESAs in the ATS are mirrored in the GL and vice versa. At end of day all transactions that have taken place in the ATS during the day will be transferred to the GL to enable a full reconciliation to be made between the ATS and GL, thus ensuring full integrity of BPNG’s accounting processes.</p> <p>Proposers should provide detailed recommendations as to how the linkage between the ATS and the GL will be implemented to ensure that the GL is kept synchronised with transactions processed in the ATS, and (possibly) vice versa.</p>	<p>M</p>	

Required Feature	Priority	Bidder's Response
<p><u>CRR Account</u></p> <p>If BPNG decides to permit use of the CRR account for intraday liquidity provision, then the CRR account balance will also be transferred to the ATS at start of day along with the ESA balance. In this case the ATS must return the same value to the CRR at the end of the day. The system should not be able to close unless this amount has been returned, and it should generate an alert if the funds returned are as a result of an automated transfer from an intraday repo to an overnight repo (if it is decided to permit automatic overnight repos).</p>	M	
<p>5.4.2 Sources of Liquidity</p> <p>Sources of liquidity in the settlement account may be:</p> <ol style="list-style-type: none"> 1. Correspondent accounts; 2. Incoming transfers; 3. Borrowing from other banks; 4. The CRR account (if permitted by BPNG – to be decided); 5. Credit extension from BPNG. 	--	

Required Feature	Priority	Bidder's Response
<p>5.4.3 Intraday Liquidity</p> <p>At any allowed time during the day a participant may request intraday liquidity from BPNG, which will be granted subject to the participant's making securities to the required value, including haircut, available as collateral via a repurchase agreement (repo) or possibly a pledge. Liquidating such securities should not require any intervention by BPNG operations staff. Proposals must contain full details of options for achieving this.</p> <p>Both the concession of credit to banks and the corresponding transfer of securities to BPNG must be capable of being carried out completely automatically (but subject to manual override by authorised BPNG system operators) and simultaneously through execution of the necessary transactions in both the ATS and GSS components.</p>	M	
<p>5.4.4 Extension of Credit from BPNG</p> <p>The system should have flexible facilities for BPNG to manage the way in which it extends credit, both intraday and overnight, to participants. For example, BPNG may wish to impose limits on individual banks, or to limit the use of overnight credit to no more than a certain number of consecutive nights or no more than a certain number of nights in a month. Should these limits be exceeded, the system should have the ability automatically to notify the Financial Systems Supervision Department..</p>	M	
<p>5.4.5 Earmarking Funds in Settlement Accounts</p> <p>Either BPNG or the participant itself should be able temporarily to reserve or earmark a quantity of the funds in a participant's settlement account up to a given level to cater for known demands (for example for purchase of currency from BPNG or settlement of clearing house net positions). In such cases the earmarked funds may not be used for the purposes of settling any other ATS</p>	M	

Required Feature	Priority	Bidder's Response
<p>transactions.</p> <p>It should be possible to set an earmark for a forward date. For example, banks order currency the day before they require delivery, so the earmark for currency purchase should be warehoused for execution the day after it is made.</p>		
<p>5.4.6 Liquidity Problems</p> <p>The system should notify BPNG and affected participants about any liquidity problems. The system should be able to monitor and provide notification of conditions including:</p> <ol style="list-style-type: none"> 1. The possibility of an account balance below the minimum level; 2. A payment order larger than a specified amount; 3. Details of payments rejected due to insufficient funds. <p>Proposals should contain details of all such conditions which can be monitored.</p>	M	
<p>5.5 Currency Issuing and Return</p>	--	
<p>As the central bank, BPNG has responsibility for the circulation of PGK currency (notes and coins). Issuing and return of currency takes place at the Currency Department of BPNG in its head office in Port Moresby, and at three regional Currency Distribution Centres (CDCs) in Mount Hagen, Lae and Kokopo. The CDCs are managed and operated by BSP under a contract with BPNG.</p> <p>At present all procedures associated with the issuing and receipt of currency are manual. This section describes how they might be automated using the ATS. Proposers are requested to describe how their systems would support these revised procedures, to comment on them and/or to suggest improvements or alternatives.</p> <p>The following suggested procedures in 5.5.1, 5.5.2 and 5.5.3 assume that the Currency Department will have access to the RTGS element of the ATS.</p>	--	

Required Feature	Priority	Bidder's Response
<p>5.5.1 Currency Withdrawal at BPNG Head Office</p> <p>The numbers in brackets in the following narrative refer to figure 2.</p> <ol style="list-style-type: none"> 1. The participant bank's branch which wishes to withdraw currency sends a withdrawal request in the form of a SWIFT MT202 message crediting BPNG, giving details of the currency it wishes to withdraw, to its head office (1). 2. The participant's head office submits the message to the RTGS element of the ATS (2). This alerts the ATS that a cash transaction has been requested. 3. On receipt of the order, the ATS advises BPNG's Currency Department immediately by suitable message (3). 4. If the Currency Department approves the transaction (4), the ATS will warehouse the MT202 for execution at start of day the following day (5). Flexibility could be built into the system to cater for alternative delivery dates, for example 'emergency' currency issues on the same day (probably with a charge), or a date further into the future than tomorrow. However, to date in PNG currency issues have always been made the day after the request is made to the Currency Department. 5. At the same time, the ordering participant is advised by a suitable message which contains an automatically generated code or 'secret' (6) that will be required to be presented by the collecting party. 6. The following day the transaction is settled in the ATS (7) at system start of day (physical collection of currency usually takes place around 10.00 a.m.), and a message is sent directly to the Currency Department authorising the release of the currency (8). A similar message is also sent to the ordering bank branch. 7. The person collecting the cash will need to produce the code produced in (6) and will also need to prove authorisation, most likely by logging on to the 	H	

Required Feature	Priority	Bidder's Response
<p>system with their personal digital signature (9).</p> <p>8. The ATS will then generate the necessary journal entries for BPNG's GL identifying the branch from which the currency was issued.</p>		
<p>5.5.2 Currency Return at BPNG Head Office</p> <p>'Unfit notes' can be returned to the Currency Department at BPNG head office at any time. When a return is made, the declared value is credited to the bank's ESA, currently by way of a paper voucher which is raised by the Currency Department and passed to the Accounting Department for entry into BPNG's GL. When the ATS is in place, this can be done by the manager of the Currency Department directly entering into the ATS an RTGS payment instruction to credit the bank's settlement account. The ATS will then generate the necessary journal entry and pass it to the GL.</p> <p>On selected currency returns, the Currency Department carries out a subsequent full note count. If the amount returned is found to be more than the declared value, currently the extra amount is paid to the bank via warrant. With the ATS, the manager of the Currency Department will credit the amount directly to the bank's settlement account via an RTGS payment instruction.</p> <p>If the returned amount is found to be less than the declared amount, at present the Currency Department sends to the offending bank's head office a "drawing" which is a paper demand for repayment of the discrepancy. The bank's head office checks with the branch concerned and then repays the discrepancy via warrant. With the ATS, it is planned that the Currency Department will still send a drawing, but this can be done using the participant messaging feature of the ATS rather than a paper document. At the same time the Currency Department will raise a journal entry in the GL so that the expected repayment can be tracked. The bank will make restitution by payment to BPNG through the RTGS element of the ATS, which will raise the corresponding GL journal entry</p>	<p>H</p>	

Required Feature	Priority	Bidder's Response
indicating that payment has been made.		
<p>5.5.3 Currency Distribution Centres</p> <p>Outside Port Moresby, CDCs are used by all commercial banks for withdrawal or return of currency. BSP manages and operates the CDCs under contract from BPNG, but the actual currency holding in each CDC remains the property of BPNG. Therefore the movement of currency (in and out) between BPNG head office and the CDCs is a question of internal financial transfers within BPNG and thus the concern only of the GL. It does not affect the payments system (ATS).</p> <p>At CDCs, each commercial bank makes a daily withdrawal or deposit, depending on whether it has a shortfall or surplus of currency, generally in the morning. At present the manager of each CDC sends a return to the BPNG Currency Department by fax at end of day with details of the movements during the day. The Currency Department then raises the necessary BPNG GL journal entries (on paper) to debit or credit the banks' ESAs.</p> <p>With the ATS, it seems that there are at least two possibilities to update these arrangements. Neither offers a fully-automated solution, but in either case there is some mitigation of risk. Proposers are invited to put forward their own solutions for managing currency withdrawal/return at CDCs in an environment where the CDCs will not be networked directly into the ATS. The possibilities are:</p> <ol style="list-style-type: none"> 1. Each CDC is a BSP, not BPNG, location and its manager is a BSP employee. BSP has an extensive internal network linking all its locations and so the CDC manager could use the BSP network to send details to BSP's Port Moresby head office of each bank's withdrawal or deposit, either at time of transaction or at end of day as currently. Clearly BSP cannot raise RTGS payment instructions affecting other banks' settlement accounts, so there would need to be a way to translate the electronic reports from the CDC 	H	

Required Feature	Priority	Bidder's Response
<p>managers into RTGS payment instructions in the ATS.</p> <p>2. The system could continue as at present, with end-of-day reports being faxed by CDC managers to the BPNG Currency Department. On the basis of these reports the Currency Department could create the necessary RTGS transactions to update the commercial banks' settlement accounts. This would obviously have to take place before close of day in the ATS. It also has the potential drawback that actual currency transactions may take place in CDCs some hours before settlement occurs in the ATS, thus giving rise to some (at present small) element of risk.</p>		
<p>5.6 Management of Government Transactions</p>	--	
<p>5.6.1 Department of Finance – Integrated Financial Management System</p> <p>DoF is currently in process of implementing a new centralised Integrated Financial Management System (IFMS) which will support financial management across all GPNG Departments and will replace the current PGAS system (see 2.6.1.1). The IFMS will be physically located in a single central computing facility, operated by the Department of Finance, for all Departments. Once it is fully implemented, no Department will operate its own financial management system. Departments will function as separate reporting entities within the IFMS, i.e. have a balanced trial balance (Departmental debits and credits will balance – it will not be possible to have a debit in one Department and the corresponding credit in another Department).</p> <p>Under IFMS therefore, although the management of its financial affairs will still be the responsibility of each individual Department, all actual outgoing payments for all Departments will be generated centrally by the Accounts Payable module of IFMS once it has been fully implemented. Until the ATS is operational, these payments will be effected by Departments producing their own cheques through printers located at their Departments (there will not be a</p>	H	

Required Feature	Priority	Bidder’s Response
<p>central point of production for cheques).</p> <p>Once the ATS is in operation, both BPNG and DoF are agreed in principle that advantage should be taken of the consequential opportunity for fully-electronic generation and processing of GPNG payments, and that the creation of payments should be switched from Department-printed cheques to transmission of electronic payment instructions from IFMS to the ATS as much and as soon as possible.</p> <p>BPNG is working with the IFMS project team to agree how this can be achieved, and to develop a timetable for introducing fully-electronic payments. IFMS will go live with three initial Departments before the end of 2010, and DoF is then planning to move up to 18 other Departments to IFMS in 2011 and the rest in 2012 (there are 35 Departments in total).</p> <p>The outline plans agreed so far will entail connecting BPNG to the Finance Metropolitan Area Network, which is a high-speed WiMAX-based network operated by DoF with connections to all Departmental locations in the NCD. Using this connection, IFMS will transmit electronic payment instructions to BPNG for clearing through the ATS. The connection from IFMS will not be made directly to the ATS, but to BPNG’s Oracle Financials package. This will give BPNG Banking Operations staff the opportunity to check payments if desired for potential anomalies and fraudulent transactions, in the same way as they currently vet incoming cheques before clearing them through Departmental drawing accounts. This will also allow Banking Operations to hold payments in the case that there are insufficient funds in the WPA to cover them, and to reach an agreement with DoF for replenishing the WPA. Once checked and cleared for payment, the payments will be passed to the ATS for clearing.</p> <p>Proposers should comment on, and/or suggest improvements or alternatives to, the above outline arrangements, and provide details of how their solutions will</p>		

Required Feature	Priority	Bidder's Response
<p>manage the linkage between IFMS and the ATS in order to achieve, so far as possible, automatic receipt, clearing and settlement of all electronic payment instructions received from IFMS.</p> <p>Proposers should also take note that the the Papua New Guinea Financial Intelligence Unit has recently issued a guideline to all banks (including BPNG) for exercising due diligence in relation to government cheques and payments. The successful proposer will be required to work with both DoF and the PNGFIU to ensure that the ATS will support this process.</p>		
<p>5.6.2 Customs Service</p> <p>The present arrangement for collection of Customs duties is described in 2.6.1.2. As noted there, both the Customs Service and a number of Customs brokers are interested in taking advantage of the facilities that will be provided by the ATS to speed up the payment process for import entries. Using electronic payments via the ATS will also reduce the manual effort and risk associated with using paper instruments (cash and cheques). Proposers are requested to comment on, and/or suggest improvements or alternatives to, the following suggested procedure which has been discussed between BPNG and Customs. Financial proposals should include an allowance for the necessary consulting effort and software development to achieve this.</p> <p>This procedure assumes that electronic connections are in place (in addition to the existing connections between brokers and ASYCUDA) between: (i) brokers and their banks' core banking systems; and (ii) the ATS and ASYCUDA. It also assumes that at least one of the commercial banks will make the necessary amendments to its core banking system so that this facility can be offered as a service to its customers. It may additionally require some changes to ASYCUDA.</p> <p>1. As at present, the broker enters details of the import entry (Customs Declaration) into ASYCUDA, which processes it, calculates the duty payable</p>	H	

Required Feature	Priority	Bidder's Response
<p>and assigns a Registration Number. The Registration Number is in the format yyyynnnnnAnnnnnn, where yyyy is the year, nnnnn is the Customs office number, A is a serial letter and nnnnnn is the serial number of the Customs Declaration.</p> <ol style="list-style-type: none"> 2. The broker, either manually or via its in-house IT system, sends details of the Customs Declaration to its bank's core banking system, via either Internet banking or a secure on-line connection. These details will include: (i) the Registration Number as per 1 above; (ii) the amount of duty payable; (iii) an indicator field showing whether the payment is being made by the broker or the importer; and (iv) either the broker's or the importer's 17-character tax code. 3. The bank's core banking system converts the information to an RTGS payment instruction (e.g. customised MT103) in favour of the WPA in BPNG and sends it to the ATS. 4. Subject to the normal ATS queuing rules, etc., the ATS settles the payment immediately and notifies the bank in the usual way as for any RTGS payment. 5. The ATS also generates a message to the Customs Service (either an automated message directly to ASYCUDA or possibly an email message to the relevant Customs office) confirming that the payment has been made and settled and quoting the Registration Number of the Customs Declaration. 6. (Optionally) the bank notifies the broker that the payment has been successfully made. If the notification has been made to ASYCUDA, then the broker could get confirmation of payment via that means. 7. Using the Registration Number of the Customs Declaration to identify the import shipment, the broker collects the goods from the Customs office. 		

Required Feature	Priority	Bidder's Response
<p>5.6.3 Internal Revenue Commission</p> <p>In April 2010 the IRC signed a contract with the Canadian company CRC Sogema to implement the Revenue Administration System Redevelopment Project. The first phase of this project covers analysis of IRC's processes and procedures with a view to introducing a new integrated information to be based on CRS Sogema's Standard Integrated Government Tax Administration System (SIGTAS) system. The successful proposer will be expected to work with IRC and CRC Sogema to achieve a suitable level of integration between the ATS and SIGTAS for supporting fully electronic payment of taxes.</p>	H	
<p>5.7 Interface to Participant Bank Systems</p>	--	
<p>5.7.1 Messages</p> <p>As a minimum the system must support SWIFT standard MTnnn formats for all messages.</p> <p>BPNG's preference is for the system to use ISO 20022 (UNIFI) formats for all messages, both RTGS and low value (ACH). Proposers should provide information on all standards that their systems follow, particularly their forward development plans in this area.</p>	M	
<p>5.7.2 Participant Terminal Equipment</p> <p>For single payments, access may be from either a single dedicated PC for smaller institutions or any number of authorised workstations and users on the LAN in the case of larger participants.</p>	M	
<p>5.7.3 Integration with Participants' Core Banking Systems</p> <p>The system must provide standard linkages to enable straight-through processing (STP) for all payment types. This will require participants to carry out the necessary systems work to integrate their core banking systems with the</p>	M	

Required Feature	Priority	Bidder's Response
<p>ATS. The selected supplier of the ATS will be required to work with the commercial banks to assist them to do this, to provide full interface specifications for implementation of STP at no charge, and to provide any necessary technical support and advice during the implementation process.</p> <p>As all four commercial banks use the same core banking package (ICBS), BPNG will explore with the banks and the contractor the possibility of implementing a common set of linkages for all. Proposers should give references for any countries where they have implemented an interface between their system and ICBS.</p>		
<p>5.8 Monitoring and Reporting</p> <p>The system must provide a comprehensive and flexible set of monitoring, reporting and analysis capabilities, to enable each participant to have maximum information about, and control over, its participation in the system (analogous to the way users of online banking services can control all activities of their various accounts themselves via an internet web browser connection).</p>	M	
<p>The monitoring, reporting and analysis capabilities should cover:</p> <ol style="list-style-type: none"> 1. Intraday monitoring reports; 2. End of day reports; 3. Reports on historical system activity. <p>In the case of participants other than BPNG, these facilities must be strictly confined to their own participation in the system, whereas BPNG must be able to get information on the operation of the entire system.</p> <p>The intraday monitoring facilities should be available on demand, while the end of day reports should be provided automatically to specified users within both BPNG and participating banks.</p>	M	
<p>The historical analysis facility should provide a wide range of capabilities,</p>	M	

Required Feature	Priority	Bidder's Response
including both a flexible database enquiry capability and also the ability to download extracts from the historical database for further analysis using tools such as statistical analysis or spreadsheet packages. This facility will be available to non-BPNG participants only via requests to BPNG Payment Systems Department..		
The historical database must be held separate from the online (current day's) database, for reasons of both performance and security. BPNG will agree with the successful proposer how many months' historical data should be held online (as opposed to offline archiving) during system implementation.	M	
<p>5.8.1 Intraday On-line Information for BPNG</p> <p>The system should provide at least the following information to BPNG operational users, authorised departments and auditors:</p> <ol style="list-style-type: none"> 1. Single message and input batch file status; 2. Total daily, weekly, monthly, and annual activity (for each originating participant and receiving participant); 3. Possible duplicate message reports; 4. All account balance information, by participant; 5. Enquiry into payment instructions in the system (allowing for different selection criteria); 6. Alerts when queues build up beyond defined limits in terms either of number of payments or of amounts to be paid. Such limits will be defined by BPNG; 7. Summarised security reports regarding unsuccessful log-on attempts, invalid messages (with reason for invalidity); 8. A graphical display showing the status of payment queues, and indicating 	M	

Required Feature	Priority	Bidder's Response
areas of gridlock etc. Such a display would be incorporated into the 'dashboard' described in 4.8.2.		
<p>5.8.2 Intraday On-line Information for Participants</p> <p>The following will apply to participants:</p> <ol style="list-style-type: none"> 1. Participants will receive an immediate message for all payments made or received by them; 2. In case of service disruptions at a participant, BPNG must be able to notify all participants of the situation and of any extension of the normal operating day that may result from this situation; 3. A participant must be able to trace any individual transaction or batch through all stages of processing; 4. Participants should be able to enquire on the status of their payment queues throughout the day as well as the running balance of their respective settlement accounts. The system should provide at least the following information to participants: <ol style="list-style-type: none"> 1. Enquiry access to the participant's own settlement account balance; 2. Enquiry into payment instructions in the system (allowing for different selection criteria); 3. Notification of the status of payment instructions sent/received debited/credited, whether successfully processed or rejected; 4. Validation error description; 5. Enquiry access to their own outgoing queues; 6. Enquiry into calculated intraday daily average balances; 7. Transaction activity and charges; 	M	

Required Feature	Priority	Bidder's Response
<p>8. In addition to the online flow of information during the processing day, each participant will be provided with an electronic file containing sufficiently detailed information to support automated account reconciliation. This information can be sent throughout the day in response to requests received from the participant;</p> <p>9. A full, daily statement will be sent to each participant as part of end-of-day processing.</p>		
5.9 Account Maintenance and Monitoring	--	
<p>5.9.1 Account Opening and Closure BPNG will have the authority to open, close or suspend any account held within the system. If an account is suspended, no outgoing payment transactions may be made, but the system should enable BPNG either to permit or to disallow incoming payments to be received.</p>	M	
<p>5.9.2 Maintenance of Intra-day Credit Limits BPNG will have the authority to determine and operate all arrangements relating to the provision of intra-day credit.</p>	M	
<p>5.9.3 Account Monitoring by BPNG For system management purposes, BPNG will have access to all settlement account information. The system should have comprehensive facilities to display online information on the overall liquidity situation of the system, both continuously throughout the operating day and as a snapshot for the current period and compared to previous period (hours, days, and weeks), via the dashboard capability described in 4.8.2.</p>	M	
<p>5.9.4 Settlement Account Histories The system should maintain on-line records of settlement account transactions</p>	M	

Required Feature	Priority	Bidder's Response
for the current month and archives of the historical data for the period as provided for by the law (seven years). The system should provide a range of graphical capabilities to assist activity and liquidity monitoring; for example, a graphical display representing the number of queued payments per bank and the current performance indicators.		
5.10 Linkages to External Systems. The ATS will have a number of linkages to external systems, including:	--	
5.10.1 BPNG's accounting system (Oracle Financials version 11i) This is a critical linkage which will be used for a variety of purposes. The ATS must work as a mirror system to the accounting system, to facilitate payments on the ESAs which will be copied into the ATS at start of day. The ATS will be responsible for maintenance of these accounts with BPNG during its operating hours. In addition the ATS will be required to generate the requisite journal entries for payments made or received by BPNG on its own or GPNG's behalf, to ensure these are posted to the correct accounts in the GL. The interface to the accounting system will also be used for submission of payments by BPNG, both on its own account and on behalf of GPNG (see 5.6).	M	
5.10.2 BPNG's Comprehensive Reserves Management System (CRMS) This linkage will be used for settlement of: <ul style="list-style-type: none"> ▪ Movements in BPNG's own securities portfolio (purchases and sales of securities); and ▪ The Kina leg of BPNG's forex transactions. 	M	
5.10.3 BPNG's data warehouse This will not strictly speaking entail a special linkage, but rather the necessary data extraction capability will be developed by BPNG's database administrator,	M	

Required Feature	Priority	Bidder's Response
for which purpose the successful proposer will be required to provide detailed database schemas for the IPPS databases.		
<p>5.10.4 Participants' in-house core banking systems</p> <p>The objective of this linkage is to support a high level of automation of participants' payments transactions based on the principles of Straight-Through Processing (STP), and to enable participants to start offering new electronic interbank payment services to their customers.</p>	M	
<p>5.10.5 Future interbank card switch</p> <p>BPNG's strategy for development of the National Payments System envisages the introduction of an interbank switch for processing of all EFTPOS and ATM transactions. Implementation of the switch will take place after the ATS has gone into live operation. The objective of the linkage will be for the settlement of net interbank positions from the card switch.</p>	M	
<p>5.10.6 Possible future trading systems</p> <p>These may include an interbank money market and/or forex trading system.</p>	M	
<p>5.11 Participants and Volumes</p>	--	
<p>5.11.1 Participants</p> <p>All four commercial banks and BPNG will be participants in the system and will hold settlement accounts in the ATS.</p> <p>The system may allow indirect participation. For this purpose it will maintain a directory of participants.</p> <p>As described in 5.6, GPNG payments will be submitted to the system via an electronic link between DoF and BPNG, but DoF will not be a participant in the ATS. Interfaces will be required, however, between the ATS and systems installed in DoF, IRC and Customs for the purpose of reporting on payments</p>	M	

Required Feature	Priority	Bidder's Response
made/received.		
<p>5.11.2 Volumes and Performance</p> <p>The usage volumes of current instruments (bulk payments, cheques and warrants) are given in earlier sections (2.2.3 and 2.3.1). Volumes of interbank payments, particularly from GPNG, are expected, however, to increase significantly in the next few years once the ATS is operational, as electronic payment instruments become more widely available and accepted, the economy continues to grow, and new methods of payment are introduced. In particular the overall GPNG budget (including provincial and local government) is forecast to triple in the next decade. It is therefore difficult to specify the required processing capacity for the ATS.</p>	--	
<p>Proposals should contain benchmark data to indicate the number of transactions of different types per minute or hour that the proposed solution is able to process, on the target hardware configuration. This information should also indicate both any constraints and growth paths available.</p>	M	

6. Specific Functional Requirements for the Government Securities System

Required Feature	Priority	Bidder's Response
<p>The primary purpose of the GSS will be to allow the maintenance of accurate records of transactions relating to BPNG and GPNG securities in the capital markets. To this end it will contain both depository and primary market (auction) functionality.</p> <p>Note: this section is included for proposers' information, as BPNG expects to continue to use its RMS for the specified functions. In the interests of completeness of information, however, proposers are asked to provide a response to this section.</p>	--	
<p>6.1 Objectives</p> <p>The main objectives of the GSS are the following:</p> <ol style="list-style-type: none"> 1. Provide an online centralised electronic registry for all GPNG and BPNG (and in future potentially other issuers') securities which will meet the needs of all issues, issuers, holders, managers and other interested parties; 2. Improve the efficiency and the security of the system by operating on the basis of both Delivery versus Payment (DvP) and Straight-Through Processing (STP), through linkages with the ATS component; 3. Integrate the clearance and settlement of all government securities transactions; 4. Support intraday liquidity management and other monetary policy operations of BPNG; 5. Support portfolio management by instrument and maturity profile; 6. Facilitate entitlement processing including redemption, interest and tax payments; 	--	

Required Feature	Priority	Bidder's Response
7. Facilitate the electronic processing of repurchase agreements (repos); 8. Provide online enquiry facilities to all legitimate enquirers.		
The GSS will be closely-coupled with the ATS: (i) to ensure Delivery versus Payment (DvP) for transactions in Government and BPNG securities; and (ii) to support the process of intraday liquidity management in the ATS.	M	
6.2 Functional Characteristics. The GSS should provide at least the following functions:	--	
1. Maintain a register of all GPNG and BPNG securities issued by amount, interest rate, maturity date, holder, and other pertinent information;	M	
2. Maintain a register by different layers of all counterparties (securities holders and dealers), detailing whether the depositor is direct or indirect, and all relevant static information such as: name, physical address, email address, telephone, tax registration number, etc. All counterparties must be identified by codes that will enable easy searching of such information;	M	
3. Have a settlement application tightly linked with the ATS component, for the settlement of primary and secondary market operations, open market operations of BPNG and intraday liquidity operations, so as to guarantee that the principles of DvP and STP are respected. This settlement application should also serve as a facility to settle interest and maturities on debt securities, and in future may be required also to settle corporate securities;	M	
4. Incorporate a primary market capability to manage the issuance of all relevant securities;	M	
5. Contain functionality to support portfolio management by BPNG for its own holdings, and for other participants;	M	

Required Feature	Priority	Bidder's Response
6. Be capable of supporting a linkage to any future electronic inter-bank collateralised funds market trading system;	M	
7. Be capable of supporting a linkage to the PETS electronic trading system operated by POMSoX, if required in future, implementing DvP and STP for settlement of equities trades;	M	
8. Adhere to ISO 15022 message formats in conformance with the minimum international standards for messages generated, as set by the BIS Guidelines;	M	
9. Provide a single, integrated view of each dealer's position for monitoring, supervising and controlling their liquidity;	M	
10. Generate detailed and summary reports with the capability of online viewing before printing and downloading to external applications;	M	
11. Allow enquiries by BPNG and the Department of Treasury.	M	
6.3 Delivery versus Payment (DvP)	--	
<p>The system must support DvP Model 1 as defined in the BIS document: <i>"Delivery versus Payment in Securities and Settlement systems"</i>.</p> <p>The GSS must provide an automated and efficient interface to the ATS component to enable changes of securities ownership in the Depository to be simultaneously matched with exchanges of value in the ATS component for true DvP processing. Transfer of ownership cannot occur until a confirmed payment message is received from the ATS component.</p>	M	
<p>6.4 Functionality.</p> <p>BPNG wishes to ensure that the GSS component provides a leading edge, world-class capability to the Government and financial markets of PNG. The GSS must</p>	--	

Required Feature	Priority	Bidder's Response
therefore contain a comprehensive set of functionality to support the objectives and characteristics described above. Proposers must provide full details of the functionality offered by their proposed solutions.		
<p>6.4.1 Roles</p> <p>The GSS should provide support for different, and multiple, roles by participants such as:</p> <ul style="list-style-type: none"> ▪ Registrar; ▪ Broker; ▪ Issuer; ▪ Administrator; ▪ Regulator/overseer; ▪ Beneficial Owner; ▪ Holder. 	M	
<p>It should additionally support different types of User/Trader classifications including, for the traders:</p> <ul style="list-style-type: none"> ▪ Traders acting as beneficial owners; ▪ Traders acting on behalf of other beneficial owners; ▪ The activities carried on by traders should be recorded in the “type of trade” record. Each trader should be able to act both ways. ▪ Ability to handle fixed rate bonds and the re-pricing of variable rate bonds according to the algorithms determined by the issuing authorities. 	M	
<p>6.4.2 Entitlement Processing</p> <p>The GSS must automatically generate entitlement proceeds to be credited to</p>	M	

Required Feature	Priority	Bidder's Response
<p>registered instrument holders on the due date. The interest proceeds must be reconciled against the original issue portfolio and passed to the ATS component for payment to the relevant beneficiary by settling on the account of the intermediary or the beneficiary's commercial bank.</p>		
<p>6.4.3 Tax</p> <p>The entitlement processing module must calculate tax due on entitlement payments (ensuring that no tax is deducted from holders marked as tax exempt), deduct the tax payable prior to payment to the beneficiary, and transfer information on all taxes deducted to the ATS component with: (i) an RTGS payment to GPNG's Waigani Public Account (WPA) for the total tax collected; and (ii) details of individual deductions including amount, taxpayer ID, etc., to be transmitted to IRC for updating their taxpayer system.</p> <p>GPNG may change the rate of tax at any time, and so this must be easily updatable in the system by authorised BPNG staff.</p>	M	
<p>6.4.4 Management of Issues</p> <p>It must be possible for the same bond issue to be re-opened for further subscription until some pre-determined maximum size is reached. For such re-opened issues, the GSS must update all relevant issue identification and summary data, including the addition of the numbered units of value in the additional re-opened issue.</p> <p>The system must also be able to handle tap issues of Central Bank Bills as defined in 2.4.2.1. A tap issue is made for a set amount and is closed only when it is fully subscribed. Each individual allocation is made on the day of purchase.</p> <p>Both fixed rate bonds and the re-pricing of variable rate bonds must be handled according to the algorithms determined by the issuing authorities.</p>	M	
<p>6.4.5 Portfolio Management</p>	M	

Required Feature	Priority	Bidder's Response
<p>The GSS will contain a comprehensive range of standard portfolio monitoring and management functionality to allow BPNG to define and manage its own portfolio of financial assets.. These will include:</p> <ul style="list-style-type: none"> ▪ A valuation (mark-to-market) function; ▪ Calculation of accrued interest (gains and losses on the portfolio) with automatic generation of journal entries for posting to BPNG's GL.. 		
<p>6.4.6 Repurchase Agreements (Repos)</p> <p>The GSS must have the ability to handle repos (including the ability to handle multiple securities in a single repo) by recording the change of ownership and the associated obligation to sell-back in the agreed number of days. A repo cannot reach maturity later than any of its underlying assets.</p>	M	
<p>6.5 Beneficial Owner and Holder Information</p> <p>The Beneficial Owner record is the record of ownership of securities. It may be a single person or organisation, or a number of people and/or organisations.</p> <p>A Holder is an individual person or organisation. All holders must be identified by a unique identifier (UID).</p>	M	
<p>The system must be able to record ownership registration records against the lowest level of issue component recorded.</p>	M	
<p>6.5.1 Beneficial Owner Record</p> <p>The GSS must hold a record of each beneficial owner of a security. The Beneficial Owner record must include:</p> <ol style="list-style-type: none"> 1. A unique identifier referencing the Beneficial Owner. In the case of a single holder this could be the UID. Where there is more than one holder, the Beneficial Owner record must identify the Holders (see "Holder Record" 	M	

Required Feature	Priority	Bidder's Response
<p>below;</p> <p>2. An indication if the Beneficial Owner is a single Holder or a group of Holders;</p> <p>3. Who may request a change to Beneficial Owner record or authorise the trading of securities, or if such activity requires all holders to agree;</p> <p>4. Similarly payments instructions for entitlement payments.</p>		
<p>6.5.2 Holder Record</p> <p>Holders must be unique within the system. The Holder record will maintain basic information for the purposes of ensuring any holder is only recorded once in the system. Dealers will be expected to keep this information up to date, but may hold additional information in their own systems linked to the Holder record in the GSS. The holder record must include:</p> <ol style="list-style-type: none"> 1. A UID that is unique in the system, and has the ability to be validated using an appropriate validation routine; 2. Normal contact fields such as first name, last name, address, telephone number and e-mail address, each of which is searchable; 3. Domicile information; 4. An indication of whether the holder is tax-exempt; 5. Economic classification (e.g. coffee grower, commercial bank...). <p>Holder records should marked as inactive if there has been no movement in their account for 12 months. The holder can be reactivated but only by explicit action on the part of the BPNG Financial Markets Department.</p>	M	
<p>6.5.3 Beneficial Owner and Holder Functionality</p> <p>The following functionality must be available:</p>	M	

Required Feature	Priority	Bidder's Response
<ol style="list-style-type: none"> 1. A Dealer must be able to view only those Beneficial Owners and Holders for whom that Dealer is the Custodian; 2. Any securities movement instruction must include the Beneficial Owner and Holder references; 3. The system must be capable of generating messages to the Beneficial Owner and/or Holder when any securities movement has occurred; 4. Authorised BPNG officers must be able to see all holdings in the GSS by Beneficial Owner and Holder; 5. There must be a facility to check for possible duplicates to reduce the possibility of one person having more than one Holder record; 6. The system must have the ability to issue statements as required; 7. The system must have the ability to compute and deduct tax obligations as specified in 6.4 (5) based on parameters set on individual UIDs. 		
<p>6.5.4 Holder Access to Information The GSS must have the ability to produce statements on demand at a Holder's request. The system must have the ability to charge Holders for this function.</p>	M	
<p>6.5.5 Internet Access to Information BPNG wishes to explore the possibility of introducing a GSS facility to make holder records available over the Internet. This would allow Holders and Beneficial Owners to visit a secure website where, once authenticated, they will be able to see all their holdings independent of the Dealers. Proposers should describe any facilities available in their proposed solutions to enable this.</p>	H	
<p>6.6 Primary Auction Module The GSS must contain an integrated module to manage the primary market in</p>	--	

Required Feature	Priority	Bidder's Response
government and BPNG securities.		
6.6.1 Functionality. The primary auction module should include the following functionality:	--	
1. Acceptance of bids submitted electronically, by issue, from participants at remote locations (over secure telecommunications connections), with posting of these bids within the system until the formally advised time for bid closure is reached. Bids received must not be visible to any party either within or outside BPNG until the cut-off time for bids is reached.	M	
2. The ability for BPNG to set prudential limits on the total bid value to be accepted from any particular bidder in respect of any particular issue.	M	
3. The ability to include or exclude any listed available bidder so that certain issues can be restricted in the primary market to a subset of all registered primary market traders.	M	
4. The ability to calculate the acceptance and rejection of bids according to the highest prices offered and the total value and composition of the issue to be allocated.	M	
5. The ability automatically to prepare, produce and transmit appropriate acceptance and rejection notices, payment advices and receipts.	M	
6. The ability to maintain a register of all allocations for historical reporting. This may be retained in the GSS as a record against the full issue held at summary and portfolio level.	M	
7. Automatic cut-off of bid acceptance at the time published for bid input cut-off as notified in the issue by BPNG. This time limit for bid input must be able to be set at screen level by BPNG for each issue.	M	
8. The ability to keep a tap issue of CBBs open until it is fully subscribed.	M	

Required Feature	Priority	Bidder's Response
9. The bidding system must be able to accommodate both multiple price and single price auctions.	M	
10. On Bid price input cut-off, the primary market trading system must calculate the allocation of the issue to the successful bidders according to the prices offered, to bidder financial limits, and any percentage of the issue which may be reserved for special sale to selected other institutions at other than full market rates.	M	
11. The ability to print certificates for bidders who request them.	M	
<p>12. The system must provide reports to both BPNG and bidders at the completion of the issue auction in respect of:</p> <ol style="list-style-type: none"> a. Advice to dealers of all issue components issued by amount, unit value, price, etc. This should include confirmation of summary information regarding the type and nature of the issue, interest payable, maturity date and the range of unit reference/identity numbers allocated to the new issue components for that dealer. b. Advice to BPNG and/or Department of Treasury of the composition and rates of the issue allocation by buyer, amount, rate, etc. This must include calculation and display of the yield curve for the issue 	M	
<p>6.6.2 Participants</p> <p>The participants in the primary auction are currently:</p> <ul style="list-style-type: none"> ▪ The four commercial banks and 12 Registered Bidders (Savings and Loans societies and finance companies) for BPNG issues (CBBs); ▪ The four commercial banks and 49 Registered Bidders for GPNG issues (T-Bills and Inscribed Stock). <p>The primary auction module must enforce the above (ensure that only the 12</p>	--	

Required Feature	Priority	Bidder's Response
<p>Registered Bidders can bid for CBBs).</p> <p>Proposers should note that BPNG is considering reducing the number of Registered Bidders in the primary market, with a view to encouraging a more active market.</p>		
6.7 Linkages to External Systems	--	
<p>6.7.1 CRMS at BPNG</p> <p>The GSS will have a linkage to the CRMS for the following purposes:</p> <ul style="list-style-type: none"> ▪ Transfer of information on BPNG's own purchases of inscribed stock (whether purchased at a discount or premium); ▪ Receipt of information from CRMS on movements in BPNG's portfolio (purchases and sales of securities). 	M	
<p>6.7.2 CS-DRMS at the Department of Treasury</p> <p>The Department of Treasury currently uses the CS-DRMS system for debt management. The GSS must have a linkage to this system for the following purposes:</p> <ul style="list-style-type: none"> ▪ Receipt of information/instructions on new issues of T-Bills and inscribed stock; ▪ Transfer to CS-DRMS of details on allocations following an auction of T-Bills or inscribed stock; ▪ At the beginning of the year, calculation and transfer to CS-DRMS of a detailed schedule of payments due to be made during the year; ▪ Notification of payment due on coupon payment or maturity of an issue; ▪ Transfer to CS-DRMS of portfolio management information as per 6.4.5. 	M	