

White Paper



Stockgroup™

Table of Contents

INTRODUCTION.....	1
THE MARKETSTREAM™ CONCEPT	1
MARKETSTREAM OFFERS:.....	2
USER BENEFITS OF THE MARKETSTREAM SERVICE	2
SYSTEM ARCHITECTURE	3
GPRS.....	3
MARKETSTREAM ON GPRS	4
MARKETSTREAM MAIN FEATURES	5
BLACKBERRY SPECIFIC CONNECTIVITY	6
SETTING UP A BLACKBERRY TO USE THE MARKETSTREAM SERVICE.....	7
NOTES ON SECURITY OF MARKETSTREAM WHEN USING THE BLACKBERRY MDS CLIENT	8

List of Acronyms

Glossary

APN	Access Point Name
ATM	Asynchronous Transfer Mode
BG	Border Gateway
BSC	Base station Switching Centre
BTS	Base station Transceiver System
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Server
FR	Frame Relay
FW	Fire Wall
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HLR	Home Location Register
HTTP	HyperText Transfer Protocol
IP	Internet Protocol
ISDN	Integrated Services Digital Network
IWF	Inter-Working Function
MIDP	Mobile Information Device Profile
MSC	Master Switching Centre
PDA	Personal Digital Assistant
PSTN	Public Switched Telephone Network
PTM-SC	Point To Multipoint - Service Centre
RADIUS	Authentication and Accounting Protocol
SGSN	Switching GPRS Support Node
SMS	Short Message Service
SQL	Simple Query Language
VLR	Visiting Location Register
WAP	Wireless Application Protocol

MarketStream offers:

- Access to real-time market data from 30 financial exchanges across the globe, covering foreign exchange, treasuries, futures, commodities and equities.
- Streaming portfolios providing users with a configurable list of stocks, indices and other instruments they wish to follow, presenting price and trading information as it happens in real time, with up to 20 instrument parameters available.
- Intra-day charting – displaying a combined graphical and statistical view of any selected instrument illustrating, in real time, price movements during present day trading.
- News service provided by Dow Jones Newswires which enables users to access wide and in-depth coverage of European and North American Equity markets, FX, Treasury, Energy, Metals and Commodity sectors and delivers preliminary market comment and confirmed stories as soon as they are published.
- marketStream enables users to set limit alerts on instruments in their portfolio for an immediate warning of any price changes.

marketStream incorporates the most advanced wireless technology to ensure that users receive accurate and constantly updated financial information fast – next to that an essential part in the software design of marketStream is the unique implementation of data compression, resulting in low bandwidth usage, which in turn keeps the subscribers' mobile phone bills at the lowest possible level. The service has been developed for a wide range of mobile platforms and is compatible with Personal Java-enabled devices that are supported by PocketPC and Symbian. marketStream is also compliant with MIDP Java devices, offering identical market updates with the reduced screen interface that these utilize.

User benefits of the MarketStream service

marketStream employs GPRS-based infrastructure, a packet-switching technology superimposed on GSM. With GPRS the user can choose to be "always on" but is only charged for the volume of data sent to him, instead of for the time he is connected, as is the case with conventional circuit switching networks. Due to this "always on" connection, financial data can be streamed to the device in real time, providing the information to the subscriber as soon as it comes available. The users find themselves in a better position to make well-informed trading decisions.

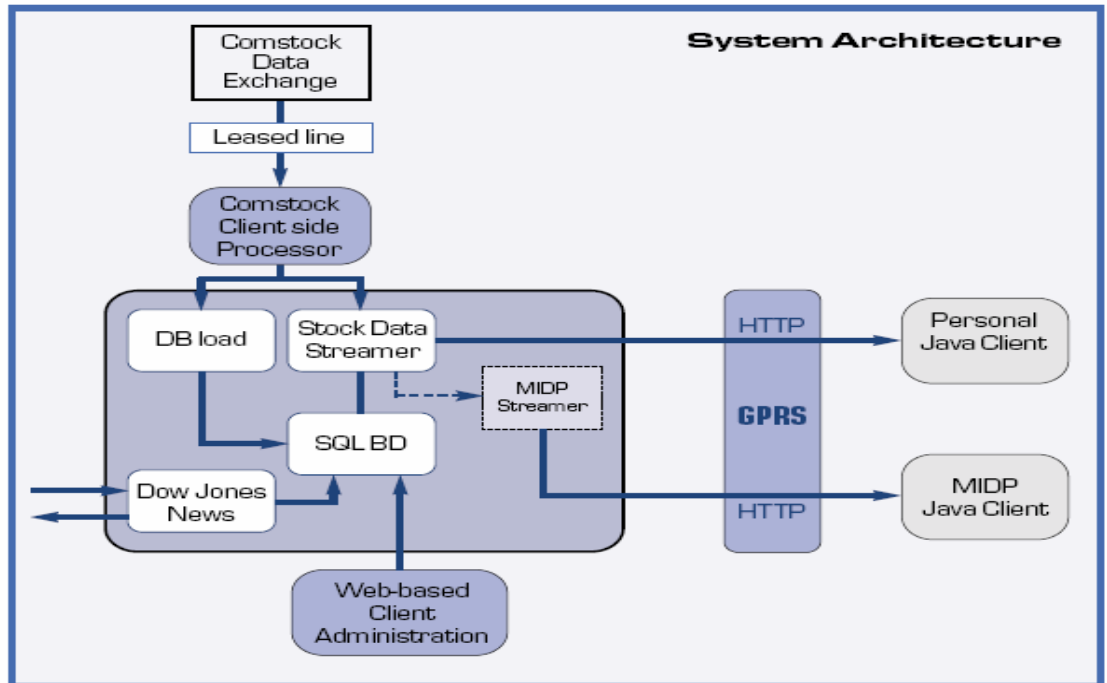
The marketStream service can be used on a large array of devices which support Personal Java, for example Compaq's iPaq, the XDA from O2 (or T-Mobile's ODA) and the Sony Ericsson P800/900. MIDP Java mobile phones have a certain restriction in the screen interface, but they do provide all the advantages of the service. Amongst the MIDP handsets currently on the market, we mention the Nokia 6100, 6610 and 7210, the Handspring Treo and the Blackberry J2ME, as supported devices.

With the larger colour displays and memory capacity available today in GPRS-enabled devices, subscribers enjoy great ease in using their mobile device, e.g. all price changes, news alerts and limit warnings are highlighted in different colours. These features contribute significantly to the user friendly appearance and operation of the marketStream service.

Furthermore, the increased capacity of these handheld devices means that subscribers to marketStream, be they traders, investors, or corporate financiers, need only a single Java-enabled mobile device to carry with them.

System Architecture

marketStream employs real-time financial exchange data provided by Comstock. This is delivered into the server system over resilient leased lines into two physically, remotely located, servers. Each system has its own database, which is shadowing the streaming of the real time market data to the client. This database also holds the entitlement provisioning for each individual user. This allows for many types and configurations of entitlements that the user may subscribe to. Client portfolios are provisioned on the user's device through the marketStream application and uploaded to the server database to maintain system integrity.



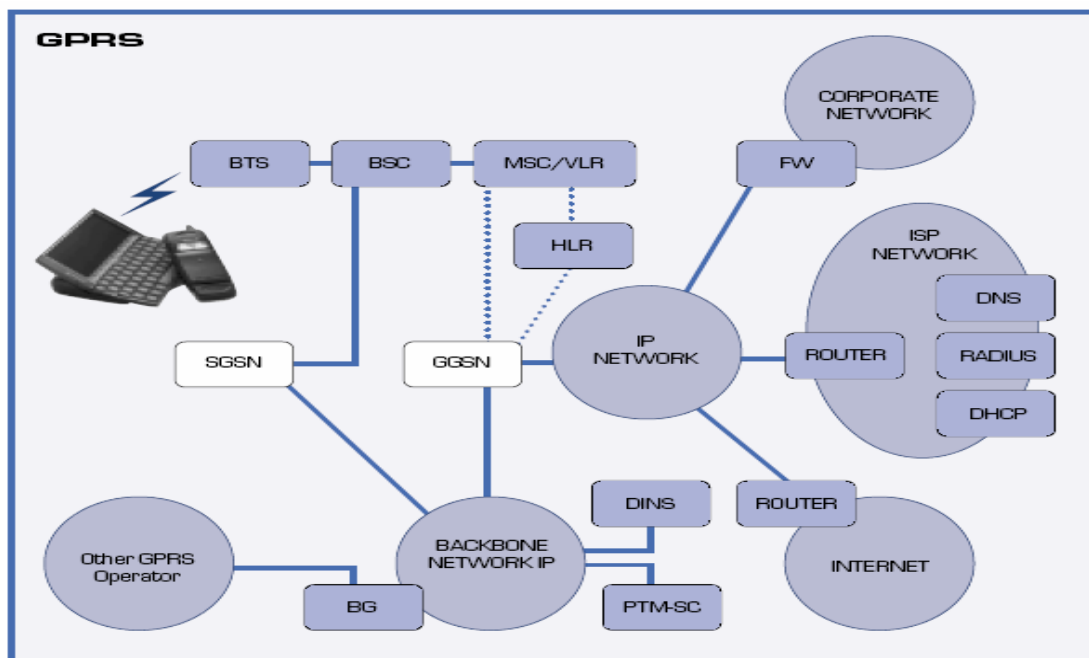
GPRS

GPRS is a packet-based technology overlaid on existing GSM infrastructure. Basically two new nodes are introduced into the GSM architecture to handle the packetising of a standard GSM radio channel. The two new nodes are the SGSN (Serving GPRS Support Node), and the GGSN (Gateway GPRS Support Node). This packetising enables more than one user to share the radio resource, and allows the user to become permanently connected by a context. The diagram shows the location of the two new nodes, which allow the user to be permanently connected to IP packet-based services.

marketStream is ideal as an application over GPRS compared with that of GSM circuit switched data, WAP, and SMS. The benefits of real time streaming financial data are realized over GPRS as the user is always connected but only pays for the amount of data sent and not for the time of connection. If marketStream operated over GSM circuit switched data then the costs of receiving updates on a portfolio of constantly updating instruments incurred by the user would be prohibitive as they would pay for connection time, rather than bytes received. SMS is only a "store and forward" mechanism, which would provide users with information updates long after they were relevant and at no guaranteed speed, effectively rendering the information useless. WAP does not

have the capability to display the necessary tables and charts that are essential to the provision of the form of information.

Furthermore, GPRS enables fast call set-up – an initial network connection takes normally less than ten seconds - and the fast data throughput and, importantly for users travelling abroad, is available in all major business regions in Europe, the Far East and the United States, with fast expanding coverage worldwide so a subscriber can use marketStream in virtually all developed countries.



marketStream on GPRS

On start-up, the marketStream client requests a GPRS context to the APN, via the GGSN of the mobile operator in which the user has a subscription – this is set up in the mobile device itself.

For marketStream to work, GPRS connectivity has to be set for the WEB access, not WAP. Once the context is active the marketStream client sends an HTTP request to the marketStream server via the Application Dynamic Tunnel. Upon server contact, the user's session ID, language, version, and portfolio of live data are sent to the server. On receipt of these parameters the server is then able to "stream" in real time the required instrument information for display on the mobile. In order to maintain the integrity of the connection a unique user ID tagged heart beat is sent between the client and server every 5 seconds.

Unlike browser-based solutions, marketStream only updates those characters within the users list of instruments that have updated, rather than refresh the viewed page as a whole. This is a key reason why the software is able to efficiently update users with real time data and yet reduce their connectivity costs.

To prevent users from downloading data beyond their requirements and paying for unnecessary bandwidth usage, subscribers have the option to implement an automatic "time out" function, which will stop their handset receiving data after a defined period of inactivity. This can be set at between 5 minutes and half an hour.

Intra-day Chart

marketStream allows for the display the streaming intra-day chart of individual stock, index or instrument. A chart plots the changes in price during the day's trading. All of this is in real time.

Alerts

marketStream enables users to set limit alerts on instruments tracked in their portfolio so they are instantly aware of important price changes.

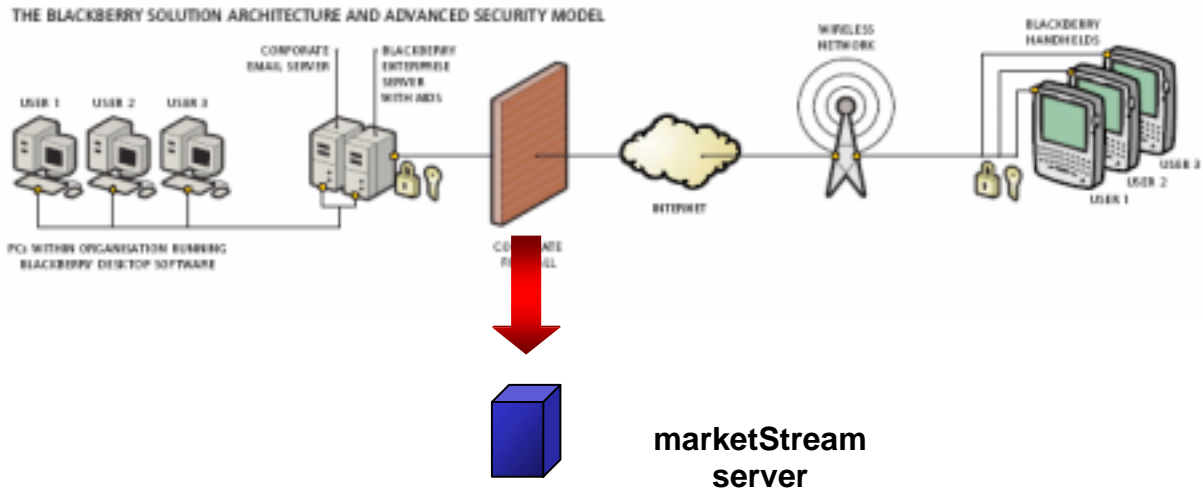
Dow Jones News

marketStream also provides users with instrument and sector related news stories provided by Dow Jones, as soon as they are published. News is delivered in one of two ways. Firstly asking for news from the main menu brings up news headlines. Clicking on an individual headline will bring up the full report. The second way is clicking on the news icon shown against the instrument in the stock watch view. This icon appears when new news is received on that particular instrument.

Blackberry Specific Connectivity

Blackberry WAP --- retail / consumer

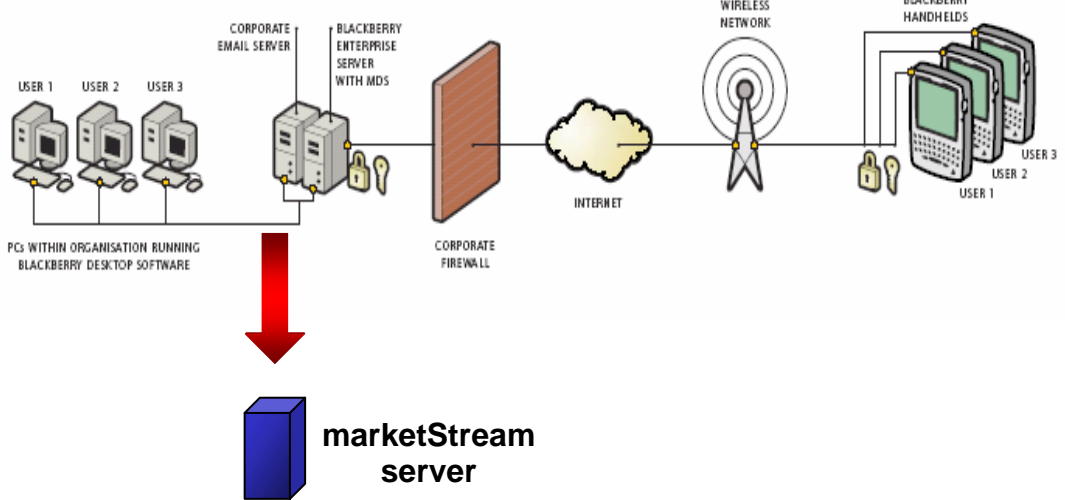
- Don't have to rely on MDS/BES gateway
- Mobile operator branded services
- Unstable for long connection periods
- Client pull streaming



Blackberry BES / MDS --- enterprise / corporate

- Configure with BES
- TCP/IP sockets – increased reliability
- Richer client & functionality

THE BLACKBERRY SOLUTION ARCHITECTURE AND ADVANCED SECURITY MODEL



Setting up a BlackBerry to use the marketStream service

BES setup

1. No marketStream software is installed on the BlackBerry Enterprise Server (BES)
2. On the BES system you need to do a minimal amount of configuration to allow the system to see the marketStream server:
 - a. Ensure that the two ports used by marketStream (8968 and 8969) are enabled for outgoing connection to the IP address of the marketStream server (217.206.134.186).
 - b. To be secure, you limit the connection to outgoing for those ports on just that IP address. It is a private connection between the marketStream server and the BES/MDS. Before any data is sent an authenticated session is established.

White Paper



© February 2004 Aether Systems Ltd. Correct at time of going to press. Services subject to change without notice.
Prices shown are for the marketStream software & subscription only, you will be invoiced by your airline and handset providers respectively for any network connection or handset provision you require. *Data marked with an asterisk is one-pilot only. All prices are subject to VAT at the standard rate. Prices shown are for a standard minimum contract length of 12 months. All 3rd party trademarks remain the property of their trademark holders.

