

# Reuters Wireless Delivery System White Paper

## Background

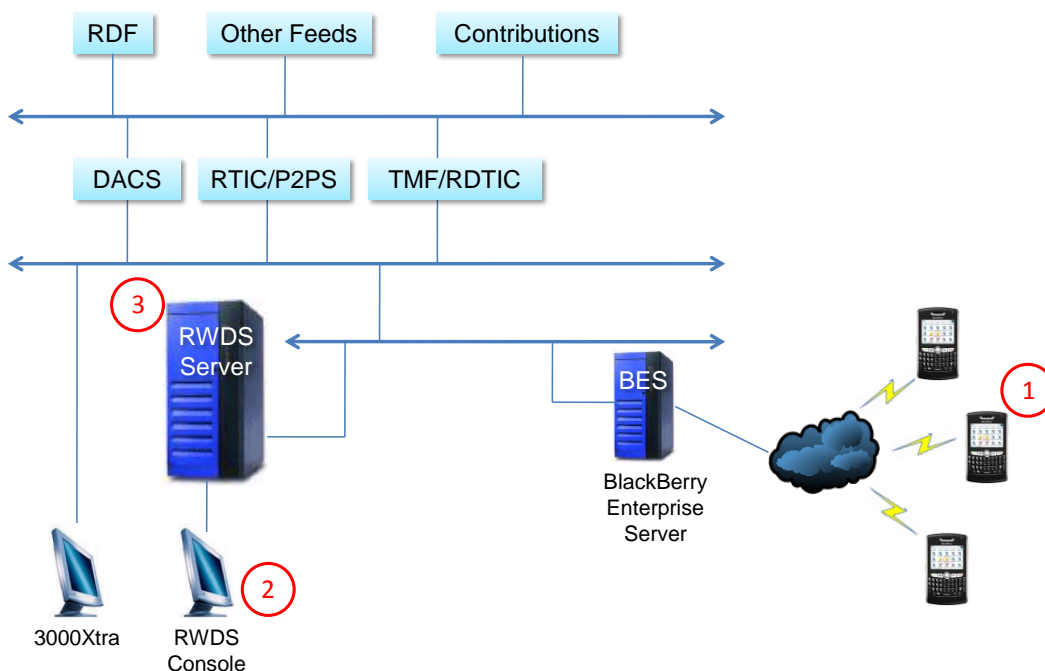
This paper is for IT managers involved in procuring and setting up the Reuters Wireless Delivery System (RWDS). It gives background on the solution's system architecture and deployment model. The paper's aim is to help you plan your RWDS installation and determine how RWDS will behave in your corporate IT environment.

## 1 Introduction

Reuters has developed RWDS in association with TECH OP AG as an extension of the Reuters Market Data System (RMDS). It uses your existing BlackBerry® Enterprise Server (BES) or Windows Mobile infrastructure to deliver streaming quotes, news, portfolio valuations, search results, alerts and basic charting to corporate BlackBerry and Windows Mobile based devices. As well as Reuters and third-party content, RWDS lets employees view their company's internal content while out of the office.

## 2 System overview

The diagram below shows a high-level logical view of RWDS components. The Windows Mobile connection is not shown here.



RWDS has three components (see red circled numbers above):

1. A client application on each handheld (Java on BlackBerry and C#/C++ on Windows Mobile)
2. An HTML-based console available from any desktop web-browser

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3. An RWDS server

## 3 Application on the Handheld

IT departments must install a small application (200Kb, although subject to change with new releases) on each end user's handheld. This can be done in several ways (see Deployment section below).

While the handheld application is running, incoming calls, SMS messages and emails are signalled in the normal way and take priority over RWDS. Press Alt-Esc on the BlackBerry or start a different application (e.g. via Start menu) on Windows Mobile to put RWDS into the background. Clicking the RWDS icon will bring RWDS to the foreground again where the user left off.

Depending on their privileges, users can choose between a static display and auto-update at conflation intervals from five seconds up. Only changes are transmitted, conserving bandwidth. By maintaining the more complex elements of the software on the server side, memory usage is reduced. This also means upgrades and patches are mainly on the server-side, simplifying deployment.

RWDS usage does not interfere with email or any other handheld applications.

## 4 Browser based Page Builder console

Users visit the RWDS Page Builder console through any desktop web-browser. The Page Builder console lets ordinary users customise the information and screens that will appear on their handhelds. Users can also share customised screens, so a useful screen need only be built once.

Administrators can use the Page Builder console to set up accounts, manage role based privileges such as alerting, update rates as well as defining preset pages which all users within a role would see.

## 5 RWDS server

The majority of the RWDS software complexity is server-side, and runs on a single Unix Server (e.g. Solaris SPARC, Solaris x86, Red Hat Linux AS4.0). This software maintains a cache of the previous 30 days news and a database of user account information. Its job is to manage the distribution of data to corporate handhelds. The RWDS server extracts requested information from feeds and other sources running on RMDS, maintaining a per user data cache. It then renders it in a format suitable for displaying on the handheld according to customisation options. The update rate to the handheld can be managed by the administrator on a per user basis, the highest rate being one page update every 5 seconds (the default is 10 seconds).

The RWDS server must be connected to a basic RMDS comprising at least a P2PS (Point To Point Server) or RTIC (Reuters TIBCO Information Cache), DACS (Data Access Control System) and an RDF (Reuters Data Feed) feed. Additionally, the server needs to be accessible from the BES (BlackBerry Enterprise Server) or ISA (Internet Security and Acceleration Server) so the latter can relay data to the BlackBerry or Windows Mobile handhelds.

The server-side software consists of a J2EE servlet called the XML Publishing Engine (XPE) and two Java processes called MNE and MUE for maintaining the news database and user

# Reuters Wireless Delivery System

## White Paper

entitlement information. These processes communicate using TIB/Rendezvous middleware, with content being passed to the BlackBerry device in XML format over HTTP. The Java Database Connectivity (JDBC) API is used to connect to two Java databases, one embedded in the XPE and one in the MNE news engine. The database in the XPE stores user pages and account details, while the database in the MNE stores news headlines and stories. The XPE databases can optionally be clustered into a single virtual database which can span a WAN. This is ideal for both load balancing and resiliency requirements.

## 6 Deployment

### 6.1 Server Side - BlackBerry

If you wish to use RWDS on the BlackBerry, you will normally need a BES with the Mobile Data Services (MDS) which in turn needs to be able to access the RWDS server using HTTPS or HTTP. For customers without a BES, the RIM hosted MDS service called BlackBerry Internet Services (BIS) is also supported. However, the RWDS server would need to be internet facing, ideally shielded by a reverse-proxy server (see next paragraph).

### 6.2 Server Side – Windows Mobile

Windows Mobile deployments require the RWDS server to be shielded by a reverse-proxy server\* such as an ISA located within a perimeter network (DMZ), which in turn needs to be able to access the RWDS server using HTTPS or HTTP. For security reasons, it is recommended to operate HTTPS between the handheld and the RWDS. For performance reasons it would also be possible to convert from HTTPS to HTTP within the ISA, allowing the RWDS server to run HTTP.

\*This server would normally already be available at the client site to access Front-End servers for e.g. Outlook Mobile Access (OMA), Exchange Active-Sync for mobile devices.

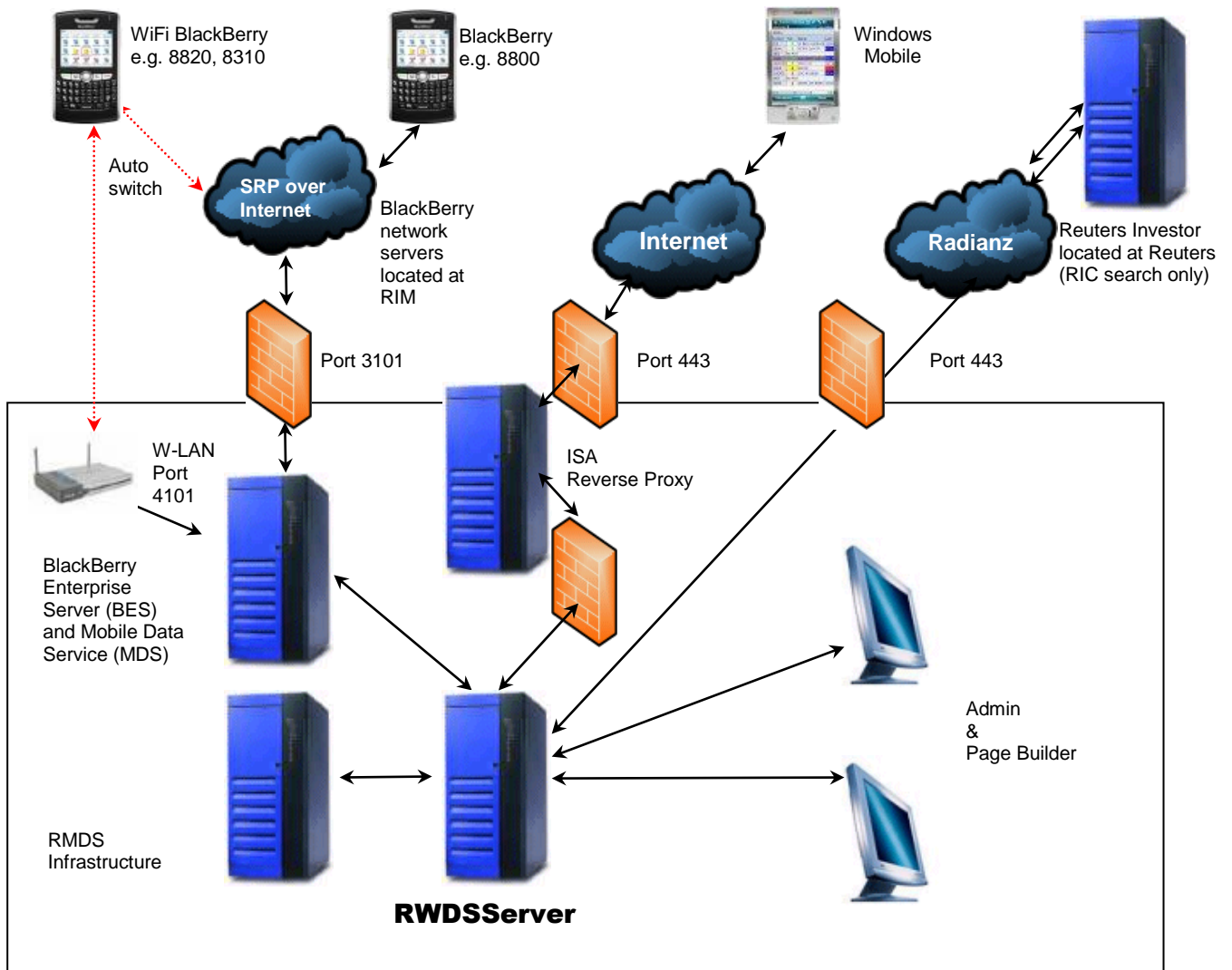
### 6.3 Client Side – BlackBerry and Windows Mobile

You can install the client application on the BlackBerry or Windows Mobile handheld in several ways. OTA (Over the Air) deployment can be achieved by emailing a link to a web server which contains the `rwdscient<version>.jad` file (BlackBerry) or `rwdscient<version>.cab` file (Windows Mobile). The client application can also be stored on a desktop PC and downloaded to the handheld OTW (Over the Wire) via a USB cable. In the case of Windows mobile the application can simply be dragged and dropped onto the handheld file system, in the case of BlackBerry, the BlackBerry Application Loader (part of BlackBerry Manager) software will need to be executed on the PC.

For larger numbers of users: In the case of BlackBerry, the client application can be made part of a BES Software Configuration and pushed out from a central store either OTA or OTW. For Windows Mobile a systems management tool such as Microsoft Systems Management Server with Smart Device Extensions or Sybase iAnywhere Afaia can be employed.

Please refer to the relevant BlackBerry and Microsoft documentation for more information on deployment.

# Reuters Wireless Delivery System White Paper



The diagram above shows the external connections and the major server components required for a mixed BlackBerry and Windows Mobile environment.

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## Hardware requirements

Blackberry handheld versions	Any handhelds running BlackBerry firmware 4.0 and above, up to version 4.2.2 has been qualified with RWDS 2.6.0. OS versions 4.3 and 4.5 are also known to work but at the time of writing have not been formally tested
BES versions tested and qualified	BES 4.1 using MS Exchange. In principle any BES supporting an MDS will work
Windows Mobile versions tested and qualified	Windows Mobile 5 and 6
Server OS	Solaris 10 (SPARC or x86 processor) and Linux Red Hat AS 4.0 with recommended patches
Web browser (for Page Builder) requirements	IE 5.5 and above.
Server hardware	SunFire SPARC or x86 HP DL360 or equivalent 2GB RAM standalone or 3GB RAM clustered Optional load balancer if using clustering

## Entitlements and DACS

Data entitlements are handled by the Reuters DACS system. DACS user IDs and passwords used to log into the desktop can also be used to log into RWDS. That means users are entitled to see all the data they access on their desktops on their handhelds, too.

If a user's maximum number of log-ins is set to one (using the DACS parameter "Allowed Simultaneous Logins"), they will not be able to log in simultaneously to their desktop and handheld. If a user is already logged in to their handheld, server-side checks will detect the attempted double log-in and display an alert message. To proceed, the user has to log off the handheld, either directly or remotely through the desktop. (The forthcoming version 6 of Xtra 3000 will also allow users to remotely log off their desktops from their handhelds and vice versa.)

By protecting against double log-ins, organisations with RWDS pay only a single set of exchange fees. If you require simultaneous access, you can increase the maximum number of log-ins above one, with associated exchange fee implications. Or you can create separate DACS accounts for mobile use, with delayed exchange data only, or with live data but from a reduced range of exchanges.

# Reuters Wireless Delivery System White Paper

## Security

Access to RWDS is password-protected and all communications between the RWDS server and the handheld – including the transmission of the password itself – are encrypted to meet the stringent privacy requirements of the world's financial markets. In the case of BlackBerry the encryption used for all communications to and from the handheld is the triple-DES or AES scheme. In the case of Windows Mobile, SSL is used. The RWDS application generates a random session key for every new handheld or Page Builder user connection. In the case of the Page Builder, the session key can be optionally stored in a cookie each time to suppress the key from being displayed in the URL line of the browser.

## Bandwidth and inactivity

The bandwidth RWDS needs varies according to use. In tests with a BlackBerry device displaying a matrix in full view, less than 25kb was used per hour. That's around 5Mb per user per month based on daily active foreground viewing of half an hour. News, depending on how much is subscribed to, can more than double bandwidth usage.

If the application on the BlackBerry device is left in the background, it lies dormant and consumes only minimal keep-alive bandwidth. Only when it's retrieved to the foreground do updates occur.

## Scalability and resilience

All RWDS processes are multi-threaded and will run across multiple CPUs. Consequently you can increase user capacity by adding CPU cards.

For added resilience and scalability you can deploy multiple RWDS servers within a cluster behind a load balancer. The load balancer needs to be set up for **sticky sessions** and can optionally make an HTTP request to an **echo** servlet (part of RWDS) to determine whether each RWDS server is functional i.e. capable of returning both news and quotes.

## Best deployment practices

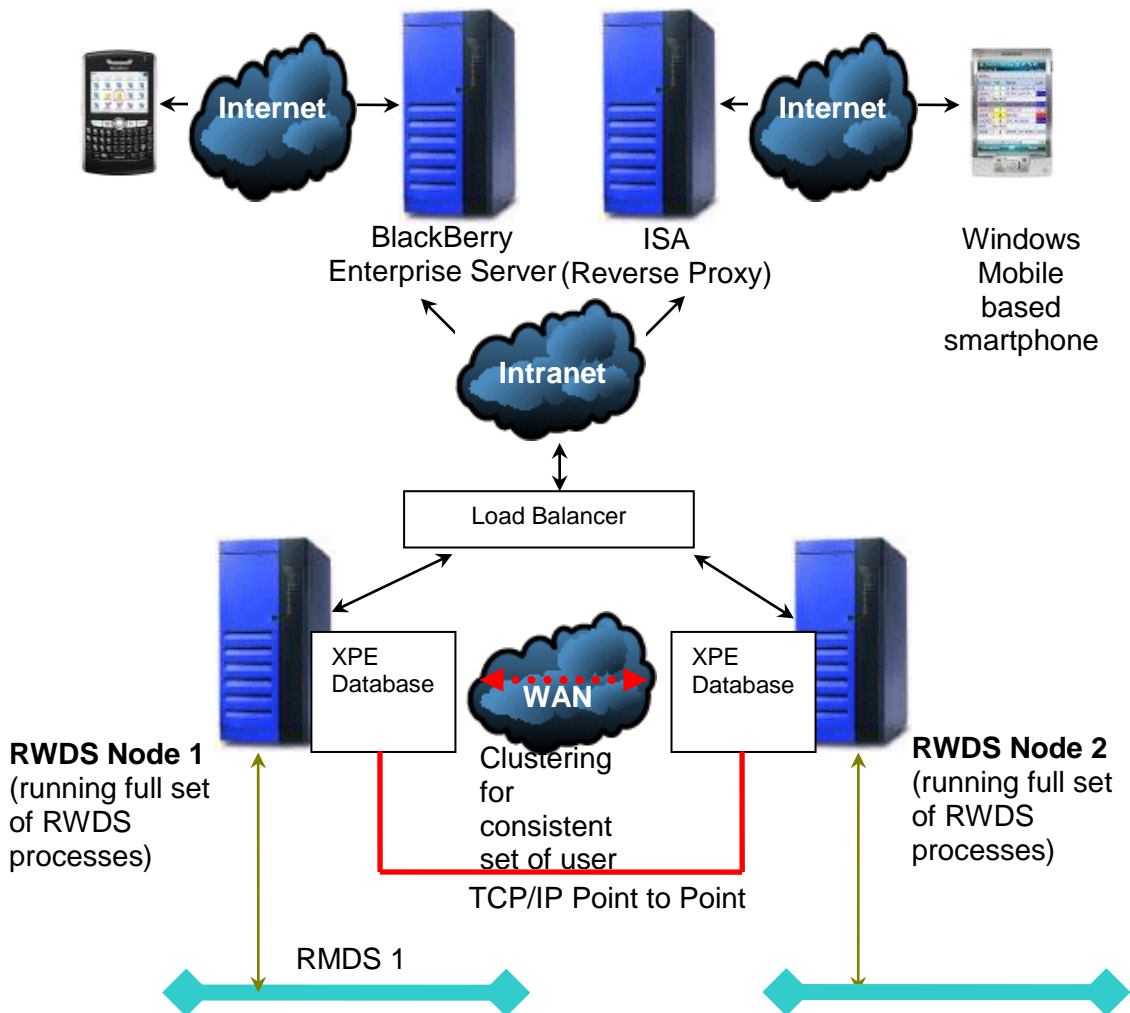
Reuters recommends you follow the guidelines below when deploying RWDS in your enterprise.

- Operate XPE across two servers over a LAN, MAN or WAN with the database clustering enabled
- Either operate the cluster across two sites or implement an RWDS cluster in a Disaster Recovery (DR) data centre
- Use a level 4 (sticky sessions) load balancer along with the **echo** service to provide transparent failover/load balancing across the RWDS servers.

These measures will ensure a high-level of resilience and speedy recovery from any RWDS problems that do arise. The diagram below illustrates these guidelines.

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## Best practices for deploying RWDS



## Conclusion

RWDS can be integrated into your corporate IT environment at minimal cost and inconvenience. The system has been designed so it can be quickly set up without disrupting existing wireless services. Now banks and other financial institutions connected to a Reuters Market Data System and equipped with BlackBerry or Windows Mobile infrastructure can get added value from both investments. They can exploit their RMDS infrastructure to deliver market data to employees on the move. And they can transform their corporate smartphones into mobile financial desktops.

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