



MAKING THE SMART CHOICE

WE DEvised THREE END-USER PROFILES AND SENT AN RFI TO THE TOP WIRELESS PLATFORM VENDORS. HERE ARE OUR PICKS, TAILORED TO SPECIFIC BUSINESS REQUIREMENTS

BY PETER RYSAVY

» To learn more about what the major players have to offer, we defined three usage scenarios representative of enterprise adoption: phone-centric, e-mail-centric and general-purpose mobile data-centric. Details on our three scenarios are provided in “Scenario: Picking a Platform” on page 56.

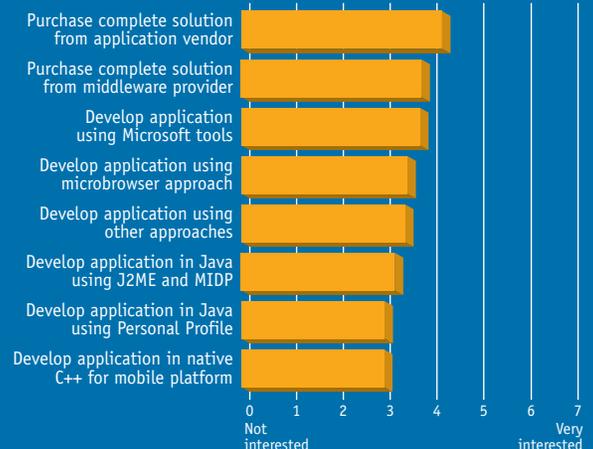
We sent Microsoft, PalmSource, Research in Motion (RIM) and Symbian an RFI, asking each to provide details on development environments; development tool vendors; available applications; messaging and e-mail support; browser capabilities; available devices; multitasking capabilities; Java capabilities; VPN support; communication capabilities, including wireless and wireline; and supported communication protocols.

We can summarize the results in a word: *impressive*. The number of features packed into these gadgets is mind-boggling. If we didn't know we were talking about handheld devices, we'd have thought we were reading descriptions of much larger systems. We've seen this before: Several years ago, PDAs were little more than standalone organizers. Now they're general-purpose computers with built in wireless networking.

There are features in common to all these platforms, as well as capabilities that make each unique. And each has strengths and weaknesses, though we are hard-

READER POLL

How interested are you in using these strategies to adopt wireless mobile applications?



Average response shown

Source: NETWORK COMPUTING E-Mail Poll, 478 respondents

pressed to identify glaring flaws in any of them. Your decision about which one to use is less likely to be driven by individual technical merits and more by the apps you wish to run and your existing back-end systems.

The Same, but Different

Before we examine the products in depth, it's worth summarizing the commonalities and differences. Each platform has packed a tremendous amount of capability into a very small footprint, and each constitutes a full-blown OS environment with features such as multitasking, memory management and complete tools for third-party application development. Each platform offers security, mainly through VPNs, and each supports the most common wireless networks, such as IrDA and Bluetooth in the personal area and CDMA2000 1X GSM/GPRS in the wide area. Many also support Wi-Fi. All have built-in organizer capabilities, and all support market-leading messaging systems, such as SMS and MMS. Each platform works with dominant e-mail systems, such as Microsoft Exchange, Lotus Notes and Internet protocols like IMAP and POP3. All have competent WML (Wireless Markup Language) and HTML browsers, and all are capable of TCP/IP networking. Finally, major software vendors such as IBM and Oracle are extending their enterprise apps to each of these platforms.

What differentiates the platforms, and sometimes products within a family, is their emphasis on phones

or PDAs. It's unlikely that a combo phone-PDA will perform as well as a single-purpose device. Each has a unique user interface and approaches to security differ. RIM has its own end-to-end security model, while PalmSource and Symbian use third-party VPNs and Microsoft includes PPTP and L2TP/IPsec VPN protocols.

Although all platforms support Java, Symbian also offers MIDP 2.0 and Personal Java 1.1.1a. And, not surprisingly, Microsoft has the strongest support for .Net on its platforms, though third-party tools are available for others if you're interested in Microsoft programming approaches—OLE, .Net and Visual Basic. How browsers format and render complex pages can vary, meaning that one device may be much more usable for some content than its rivals.

Another differentiator is the wireless networks supported. The trend has been for PDAs to support Wi-Fi or cellular and for smartphones to support cellular, as well and more smartphones are supporting Wi-Fi as well.

As for purchasing trends, in our poll we asked readers to rate how strongly they consider each platform for enterprise apps. On a scale of 1 to 7, the weighted averages for all platforms came back with values from 3 to 5—there were no strong winners or losers. From most to least strongly considered, the choices are: Microsoft Pocket PC, Palm OS, RIM Blackberry, Linux, Microsoft SmartPhone and Symbian. Most readers prefer PDAs.

As for capabilities enterprises deem most impor-

SCENARIO: PICKING A PLATFORM

We defined wireless mobile platforms as data-capable mobile devices operating over wireless networks—smartphones; PDAs with phone capabilities; PDAs connected to mobile phones using IR, Bluetooth or cable, for example; and PDAs with WLAN capabilities. We excluded notebooks.

Vendors were asked to tailor their responses to fit one of three usage scenarios that reflect typical enterprise needs:

» **Phone-centric.** These users employ wireless mainly for voice communications. They have strong opinions about the ergonomic aspects of their devices, and want their phone platforms to synchronize with PIM applications. They occasionally use their mobile devices to check e-mail, send/receive text or instant messages, and browse Web pages, but these activities are secondary.

» **E-mail-centric.** These staffers are primarily interested in sending and receiving mail. They also may use

wireless for voice communications.

» **General-purpose mobile data.** These employees seek maximum flexibility for data applications. They need e-mail, messaging, browsing, database access, file transfer and VPN capabilities. They will use separate mobile phones for voice, and may even use mobile phones as modems for their devices.

To choose the best platform for each scenario, we asked vendors to list available development environments—C++, Java or browser-based, for example—as well as development tools appropriate for the platform. We also asked how many business-related applications and types of messaging, including SMS, IM and MMS, are supported, both natively and by third parties. For the Webmasters out there, we enquired about browser capabilities and markup languages supported.

Because some enterprise users have strong hardware preferences,

we asked for a list of devices on the that use each platform, broken down by device vendor.

As for OSs, we asked about multitasking, and we queried the vendors on Java: Which versions are supported, and if Java is not supported, what's the alternative? Security is always key, so we asked for specifics on VPN support.

Since these devices are all about staying connected, we asked for a list of wireless networking technologies supported, including CDMA, GPRS/EDGE, UMTS/WCDMA, Wi-Fi, IR and Bluetooth, as well as on-board wireline communication technologies, including USB, serial and Ethernet. And, we asked which communications protocols—TCP/IP, IPv6, HTTP, POP, IMAP, FTP, SSL, TLS, telnet, IPsec, PPTP, L2TP—are supported natively and by third parties.

Finally, we let the vendors list other benefits their platforms offer for enterprise deployments.

tant, the feature that stands far above any other is strong security.

Preferred Choices

The market is simply too immature to declare a single winner, and it will be years before any of these platforms is a commodity item. In addition, while we consider all the platforms capable, in the long term we don't see the market supporting more than two or three at most. Refer to our features charts for a comparison of capabilities, and click over to ID# 1507rd1 for full vendor responses to our RFI, including detailed lists of development-tool vendors, protocols and devices supported.

We've named our preferred choice in each of the three usage scenarios. And we've provided our detailed analysis of these platforms (in alphabetical order). Meanwhile, mobile workers are enjoying an unprecedented level of access to corporate data. We gadget geeks are sitting pretty as well, and we're all looking forward to new products that doubtless will make our lives easier.

Phone-centric Choice: Symbian From the ground up, Symbian emphasizes strong voice functionality and voice integration with data functions. With Nokia the strongest driver of the Symbian platform—and the leading mobile phone company in the world—it's no surprise that the best-selling smartphones are based on Symbian. Symbian licensees are delivering a wide variety of devices, including phones with keypads, phones using stylus input and phones equipped with Qwerty keyboards.

E-mail-centric Choice: RIM The RIM platform proves that to succeed in the wireless data arena, using a desktop-computing model won't cut it. You must rethink how people work with data, which RIM has done admirably.

General-Purpose Mobile Data Choice: Tie, Microsoft and PalmSource For general-purpose mobile data, PalmSource has produced the best phone PDA ever with its Treo 600, which can leverage the huge installed base of Palm applications. This larger base makes it more likely that there is an off-the-shelf application to address your needs. Microsoft, however has the most powerful and flexible operating environment with its Windows Mobile OS, and strong support in enterprises, especially Microsoft-centric ones. The Microsoft OS also has stronger networking capabilities. Palm and Microsoft have moved their PDA battle to the mobile telephone market, where they now must contend with Symbian.

The Nitty Gritty

Linux The one platform we did not review in detail—due to its market immaturity—is Linux. The most recent version available for embedded computers, such as PDAs and phones, is kernel 2.6. This is a powerful OS with enhanced real-time performance, flexible I/O and support for microcontrollers and large memory models. Despite the fact that it owns essentially no market share, Linux could become a heavyweight, especially as the hardware platforms gain greater computing capability and if handset vendors prefer this platform. Motorola is one of the few vendors supplying smartphones based on Linux. Sharp's Zaurus PDA also uses Linux, though wireless must be added through a modem.

As Linux gains greater server market share, a Linux mobile device promises seamless extension of server data and a more comfortable development environment for organizations and ISVs (independent software vendors). Whether mobile phone vendors, such as Motorola, or Linux providers, like Red Hat, will drive this market remains to be seen. What got our attention

Wireless Platforms VENDORS AT A GLANCE

PUBLIC COMPANIES

Company name (stock symbol)	Year founded	Market capitalization as of Mar. 22 \$000	Current assets \$000	Current liabilities \$000	Revenue most recent quarter \$000	Revenue year earlier \$000	Net income \$000 (loss)	R&D spending \$000
MICROSOFT (MSFT)	1975	\$264,140,000	\$62,400,000	\$13,927,000	\$10,153,000	\$8,541,000	\$1,549,000	\$2,971,000
PALMSOURCE (PSRC)	2002	207,480	43,648	26,517	16,772	14,788	(9,123)	8,117
RESEARCH IN MOTION (RIMM)	1984	6,880,000	574,111	188,189	153,891	74,176	16,329	15,673

Source: SEC filings, Yahoo.com, Hoovers.com, company reports

PRIVATE COMPANIES

Company name	Year founded	Annual sales \$000	Employees
SYMBIAN (INDEPENDENT COMPANY OWNED BY ERICSSON, NOKIA, PANASONIC, PSION, SAMSUNG ELECTRONICS, SIEMENS AND SONY ERICSSON)	1998	\$47,300 (est., 2002)	703 (2002)

Source: Hoovers.com

was how many readers chose Linux as the platform they'd use, even though it's generally not available yet.

Microsoft Corp. For years, Microsoft has been chipping away at the PDA market with its Windows CE platform, slowly wresting share from Palm. CE is now divided into two basic versions: Pocket PC for PDAs and Windows SmartPhone for high-end mobile phones. Both are part of what Microsoft now calls "Windows Mobile." The Pocket PC is further divided into two categories, one for PDAs and one for PDAs with mobile phone capabilities, referred to as Pocket PC Phone Edition.

For devices, Hewlett-Packard has dominant market share with its formidable iPAQ line; it also has versions for Wi-Fi and/or Bluetooth, but HP does not yet offer a phone. Pocket PC Phone Edition vendors include Audiovox, Hitachi and Samsung.

The other Microsoft platform, Windows SmartPhone, has not been widely adopted by phone makers, but models are starting to roll out, such as the Motorola MPx200 distributed by AT&T Wireless. This phone

has many of the same features as the Pocket PC, but it's intended for one-hand operation and uses a phone keypad for user input instead of a stylus.

For all Windows Mobile platforms, Microsoft brings powerful developer tools and the promise of tight integration with its information systems. Although the number of third-party apps is smaller than for Palm, Microsoft cites thousands of internal corporate apps built for its mobile platforms. If you want to develop your own, Microsoft provides three approaches: Embedded Visual C++; managed code development using the .Net Compact Framework, a mobilized version of .Net; and tools for Web development. Microsoft is the primary supplier of development tools for its platform. J2ME Java with MIDP1.0 is also available. Windows Mobile supports Microsoft mail protocols and standard e-mail protocols. Messaging support includes EMS, SMS, MMS, IM and WAP over SMS. A highly capable browser is included.

Fourteen vendors offer 30 Pocket PC devices, 10 vendors offer 12 Pocket PC Phone Edition devices, and eight vendors offer 10 SmartPhone devices!

Wireless Platform Features

	Microsoft Pocket PC, Pocket PC Phone Edition and SmartPhone	PalmSource
Development environment	Native development with Embedded Visual C++; managed code development with .Net Compact Framework and Visual Studio.Net; XML Web services development with .Net Compact Framework and Visual Studio.Net, and Embedded Visual C++ with the SOAP Toolkit; mobile Web development with ASP.Net Mobile Controls and Visual Studio.Net	C, C++, forms-based, Java, Visual Basic, browser-based
Software development tool vendors	Microsoft	AppForge, Bear River Associates, Borland Software, CASLSoft, DataRepresentations, DDH Software, Metrowerks, Class Action, Falch.net, GCC Development, Handwave, IBM, NS Basic Corp., PDA Toolbox, Peter Holmes Consulting, Pocket Smalltalk, PumaTech, Quartus Handheld Software, SuperWaba, VFDIDE, Winsoft
Number of business applications	Thousands	More than 20,000 software titles
E-mail protocols	IMAP, Microsoft MAPI, PocketMSN, POP3	POP3, APOP, SMTP-AUTH, SSL, IMAP4
Messaging capabilities	EMS, IM, MMS, SMS, WAP over SMS	SMS, EMS, MMS, IM, voice, fax, HTML
Browser capabilities	CSS, HTML 4.01, XHTML, WML 2.0, Jscript 5.5, PNG, JPEG, GIF, BMP	HTML 4.01, HTTP 1.1, XHTML 1.0, CSS1, partial support for CSS2, iMode (cHTML), JavaScript 1.5, ECMA ScripDHTML, DOM Level 1, partial support for DOM Level 2
Devices (available globally, not all available in the United States)	32 devices from 14 vendors for Pocket PC; 13 devices from 10 vendors for Pocket PC Phone Edition; 10 devices from 8 vendors for SmartPhone	46 devices from 16 vendors
Supports multitasking	Y	Y
Java capability	J2ME with MIDP 1.0	J2ME with MIDP 1.0
Other managed code approaches	AppForge Crossfire	N/A
VPN products	Products from Certicom, Check Point Software, Columbitech, Diversinet, Ecutel, Entrust, Epiphany Consulting, Funk Software, Maya Software Technologies, NetMotion Wireless, RemotePipes, Symbol Technologies, V-One	Products from Certicom, Mergic and SafeNet
Wireless communications	CDMA2000 1X, GPRS, Bluetooth, IR and Wi-Fi	CDMA2000 1X, GPRS/EDGE, UMTS/WCDMA, Bluetooth, IR and Wi-Fi
Communications protocols	FTP, HTTP, IMAP, IPsec, IPv6, L2TP, POP, PPTP, SSL, TCP/IP, telnet, TLS	IPv6, UDP, HTTP, OBEX, PPP, SMS, SSL, TCP/IP

Y=Yes, N=No Note: Not all devices based on the platform necessarily incorporate all the features listed, especially if based on an older version of the OS.

Windows Mobile supports multiple wireless networks, including CDMA 1X, GPRS, Wi-Fi, IR and Bluetooth. With native IPsec, L2TP and IPPTP support, and 13 third-party vendors providing products, Microsoft's VPN offerings are stronger than any of the other vendors.

Although the Pocket PC platform is well-accepted for PDAs, the wireless industry has some misgivings about Microsoft dominating this area, which explains why Nokia, Sony Ericsson and Siemens have banded together to use the Symbian platform for smartphones. Despite this resistance, phones based on Windows SmartPhone are now available, with more on the way.

Microsoft. www.microsoft.com/windowsmobile

PalmSource Although Palm didn't invent the PDA category—that distinction belongs to Apple and its Newton—it did make the PDA successful, and it still enjoys dominant market share. Palm is now split into two companies, with PalmSource delivering the OS and PalmOne in charge of devices.

Despite significant initial growth, the PDA market is stalled at about 10 million units per year, and Palm, like others, is concentrating on wireless platforms, including those supporting Wi-Fi, like Tungsten T, and cellular, like Treo 300, 400 and 600. The Treo line was developed by Handspring, but Palm recently acquired this company, which, ironically, was started by defectors from Palm. Despite lackluster sales of the Treo 300 and 400,

the Treo 600 now appears to be a major contender in the smartphone market. Palm's greatest strength is the large number of applications available for the platform. The vendor also has a strong loyal following of PDA users who may gravitate to the Palm wireless platforms.

Palm claims more than 20,000 software titles, which it says is more than any other mobile platform. This is plausible given Palm's well-established PDA history, though you must research whether the applications you need are available, and whether applications that were written for prior versions of the OS will run on newer versions. If not, Palm provides a variety of development options, including C, C++, forms-based approaches, Java (J2ME with MIDP 1.0) and Visual Basic.

In response to our RFI, Palm listed an impressive number of software development tool vendors. The Palm platform supports all the major e-mail and messaging protocols and has a highly capable browser. Sixteen hardware vendors deliver 46 different Palm devices, though only a subset of these are wirelessly enabled. Three separate VPN solutions are available from third parties. Wireless support includes CDMA 2000 1X, GPRS/EDGE, UMTS/WCDMA, Wi-Fi, IR and Bluetooth.

PalmSource uses Palm OS 5 in the Treo 600. Palm has announced the successor version of its OS, called Cobalt, and a complete OS rewrite that provides features such as multitasking, multithreading, memory protection, support for more memory and larger screens, industry-stan-

Wireless Platform Features (continued)

	RIM	Symbian
Development environment	Java, C++, browser-based	C++, Java, Visual Basic, browser-based
Software development tool vendors	Action Engine, DynoPlex, Epicad, Kilobytes Computers, RIM, Sona Innovations	AppForge, ARM, Borland Software, Lauterbach, Macromedia, Mentor Graphics, Metrowerks, Texas Instruments, SunONE Studio
Number of business applications	Within BlackBerry ISV Alliance Program, 125 third-party applications; many other applications generated by independent vendors and in-house developers outside the Alliance Program	More than 2,000 applications available; many are business-related
E-mail protocols	Microsoft Exchange, Lotus Domino (BlackBerry Enterprise Server), Outlook, Notes, MSN, Hotmail, AOL, IMAP and POP3	POP3, IMAP4, SMTP, MHTML
Messaging capabilities	IM, SMS, Unified Messaging, Fax	SMS, EMS, MMS, Fax
Browser capabilities	BlackBerry supports HTML and WML; C++ browser supports WML. Java browser supports WML, cHTML, HTML and XHTML Basic	HTML, CHTML, XHTML and XML provided through third-party solutions and Symbian OS browser plug-in architecture
Devices (available globally, not all available in the United States)	15 devices from 1 vendor	15 devices from 5 vendors
Supports multitasking	Y	Y
Java capability	J2ME with MIDP 1.0	J2ME with MIDP 2.0, PersonalJava 1.1.1a (with JavaPhone 1.0 option)
Other managed code approaches	N/A	Flash MX (Macromedia)
VPN products	Blackberry security model	Products from Certicom
Wireless communications	CDMA2000 1X, GSM/GPRS, Nextel IDEN, DataTAC and Mobitex	CDMA2000 1X, GSM, GPRS, EDGE, WCDMA, Bluetooth and IR
Communications protocols	HTTP/HTTPS, SSL/TLS, TCP/IP	TCP/IP (dual mode IPv4/v6), USB client, WAP; multihoming capabilities and link layer QoS on GPRS/UMTS networks

Y=Yes, N=No Note: Not all devices based on the platform necessarily incorporate all the features listed, especially if based on an older version of the OS.

dard security, plus extensible communication and multimedia frameworks capable of handling multiple connections simultaneously. PalmSource also has enhanced OS 5, in a version called Garnet, with standard support for a broad range of screen resolutions, a dynamic input area, improved network communication and Bluetooth. It appears that both versions of the OS will be available, with Cobalt for high-end products and Garnet for mass-market devices; both can be used for wireless networking.

PalmSource, (408) 400-3000.
www.palmsource.com

Research In Motion The most successful

wireless data provider today is RIM with its Blackberry line. Once limited to pager-size gadgets, today RIM offers PDA-size devices with color screens and mobile-phone functionality. In our initial survey for this article, more people said they use Blackberries than any other device. The secret behind RIM's popularity is that it offers a complete messaging system, including a device that pioneered the thumb keyboard, power management that lets messages be received without the device always being on, a good client and a gateway to corporate e-mail systems. The result is easy-to-use mobile mail system that lets e-mail be pushed to users. Alternates are often based on polling approaches that are workable, but far less convenient.

RIM lists 125 third-party applications through its ISV Alliance program, a number lower than rivals because RIM has only recently opened its platform to third-party applications. Development options include Java, browser-based and C++, with tools available from five vendors. The core strength of the RIM platform is e-mail, with support for every major e-mail protocol. The browser supports HTML and WML, making these available as end applications and for both C++ and Java apps. RIM produces 15 versions of the device.

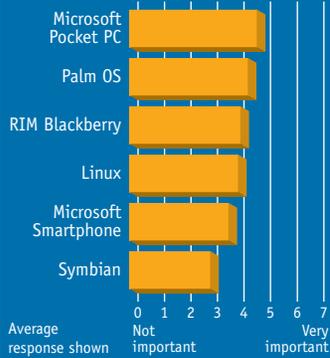
As for security, rather than supporting standard VPNs, RIM provides its own end-to-end security model, which involves adding a Blackberry server in the enterprise.

Wireless networks supported include both legacy packet networks (DataTAC and Mobitex) and newer cellular networks (CDMA 1X, GSM/GPRS, Nextel IDEN.)

How well can RIM evolve from messaging to general-purpose wireless? Hedging its bets, RIM is licensing its Blackberry so that other wireless platforms can access RIM mail gateways. The Sony Ericsson P900 Symbian devices, for example, will soon offer the Blackberry client.

READER POLL

How strongly do you consider the following mobile OS platforms for your enterprise applications?



Source: NETWORK COMPUTING E-Mail Poll, 478 respondents

This makes sense given that RIM, even with all its success, has only 1 million subscribers.

Research In Motion, (877) BLK-BERR, (519) 888-7465.
www.blackberry.com, www.rim.com

Symbian The last heavyweight in the wireless platform market is Symbian, a joint venture of Psion, Nokia, Sony Ericsson, Siemens and Samsung. Symbian's view is that the complexity of next-generation software mandates a joint effort from mobile phone leaders. Smartphones based on the Symbian platform are available from all the partners, Sendo and Motorola. Symbian phones dominate the market, partly

because of the emphasis Symbian licensees place on functionality, but more likely thanks to the market position of the top Symbian licensees.

Symbian devices span a broad range of forms, including devices with standard keypads, or with a stylus and touchpad, and some providing full keyboards. Display sizes vary as well. Symbian licenses to phone makers a version of its OS, called UIQ, while Nokia licenses a different version, called Series 60. Phone manufacturers further enhance the capabilities of their phones.

Symbian lists more than 2,000 commercially available apps, many of which are business-related. Developers can work in C++, Java J2ME with MIDP 2.0, Personal Java 1.1.1a, Visual Basic or WAP. Nine companies supply development tools. E-mail protocols include POP3, IMAP4, SMTP and MHTML, and messaging support includes EMS, MMS, SMS and fax. The platform supports browsers through third-party solutions and a browser plug-in architecture. As for hardware, five vendors supply 15 devices. VPN support is

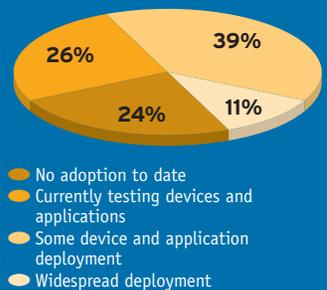
through a Certicom client. Wireless support includes Bluetooth, IrDA, CDMA 1X, GPRS, EDGE and WCDMA.

Nokia recently purchased Psion's share in Symbian, giving Nokia a controlling interest, while Motorola has defected from the Symbian camp. Although Symbian has technical merit, it remains to be seen to what extent it can remain a multivendor OS for smartphones, or whether it becomes a Nokia-dominated platform. Symbian also has work to do in gaining mind share in the United States, where alternatives are better known.

Symbian, (650) 551-0240. www.symbian.com **NWC**

READER POLL

Which best characterizes the status of wireless mobile platform adoption within your organization?



Source: NETWORK COMPUTING E-Mail Poll, 478 respondents

PETER RYSAVY is president of Rysavy Research (www.rysavvy.com), a consulting firm specializing in wireless networking. Post a comment or question on this story at www.nwc.com/go/ask.html.