RTOS Leader QNX May Give BlackBerry a New Lease on Life

Companies: AAPL, BBRY, CAVM, CSCO, GOOG, INTC, MSFT, RHAT

May 23, 2014

Research Question:

Will BlackBerry be able to leverage its QNX technology to transform itself from a hardware company to a software company?

Summary of Findings

- The automotive, medical and Internet of Things (IoT) fields are experiencing greater need for real-time operating systems (RTOS) in which devices are able to instantly "talk" with each other. QNX is best in class in RTOS technology, positioning parent company BlackBerry Ltd. (BBRY) for a potential turnaround.

- All 14 sources who commented said QNX was the automotive market's RTOS leader, and were positive on its five-year outlook.

- QNX has further growth potential in the medical field, thanks to its reputation for reliability and its FDA certification. Two sources predicted a 25% increase in QNX's medical business during the next five years.

- QNX has a head start in IoT, but Linux is a viable competitor in this field because of price. However, sources questioned the security of Linux's open-source OS. The choice between the two would depend on the application.

- QNX's areas of possible expansion include industrial automation, the military, clean air emission measurements, intravehicle connectivity, and agriculture.

- Until a real competitor emerges, QNX can demand premium pricing.

- QNX fits into the trend of slower cloud adoption rates resulting from security and bandwidth restrictions, which Blueshift Research discussed in previous research (our March 4 NSA report and our May 14 Tech Trends report). QNX technology stands to be leveraged as applications steer away from routing through the cloud and toward direct interaction via RTOS.

- Sources for our May 14 Tech Trends report said Cisco Systems Inc. (CSCO) would benefit from enterprises keeping core IT systems in-house. Cisco's "fog" is dependent on devices being able to communicate with each other and to bypass the cloud, and QNX dominates in providing this ability. Two sources expect Cisco to buy QNX from BlackBerry.

Silo Summaries

1) Automotive IT Executives
All nine sources see growth potential for BlackBerry's QNX in the auto market for the next five years. Of the sources who commented on pricing, three expect QNX to maintain its pricing power, one said the auto companies are in control of prices, while a fifth source said QNX's prices would rise initially if BlackBerry were to sell the company. One source believes Cisco will buy QNX. Areas of potential growth for QNX includes manufacturing, industrial applications, intravehicle connectivity, military and agriculture.

2) Healthcare IT Executives
All three sources believe BlackBerry's QNX has staying power in the healthcare industry. Two expect QNX's pricing to increase about 25% during the next five years. The third source said pricing will depend on volume. One source said QNX has 60% market, followed by Wind River.

3) IoT Executives/Software Engineers
One of these two sources said BlackBerry's QNX is important in the medical field. It also has room to grow in IoT, but so do Microsoft, Android and Linux. The other source said Linux is becoming more competitive through its lower price point but added that **QNX offers more technical support, which allows it to demand a price premium.**

4) Software Engineers
Five of eight sources commented on BlackBerry's QNX in the auto market and believe **the technology will grow during the next five years. Seven of the eight sources said QNX will continue to expand in the medical field, including one source who expects it grow 50% to 60% among hospitals in particular.** One source, a Linux proponent, cited little reason to use QNX because Linux is less expensive and provides comparable features. Two sources said QNX holds pricing power, one predicted the company will increase its auto sector prices by 50% to 60% during the next five years, and two foresee pricing pressure as competition increases.

5) Software Security Experts
QNX's FDA certification will allow the BlackBerry subsidiary to grow in the healthcare area during the next five years, according to two sources who commented. One foresees growth of 4% to 5% because of QNX's superior support and non–open-source technology. One source sees QNX's pricing as under pressure, one believes its pricing power will hold, and a third source said QNX can demand a premium price because of its reputation.

BlackBerry Ltd.'s QNX

	BBRY's QNX Growth Next 5 Years
Automotive IT Executives	⬆
Healthcare IT Executives	⬆
IoT Executives/Software Engineers	⬆
Software Engineers	⬆
Software Security Experts	⬆

Background

BlackBerry is shaking things up by transitioning from a hardware company into a software-first company after years of disappointing investors and customers. The first step was to focus on subsidiary QNX's software, which allows people to control their smartphones and other devices by voice in the car. Ford has joined Audi, General Motors, Honda and Hyundai in adopting QNX software, and has abandoned Microsoft Corp.'s (MSFT) Sync. Also, Apple Inc. (AAPL) uses QNX instead of its own iOS software to allow its iPhones to be connected to vehicles.

Now BlackBerry is leveraging QNX technology to expand into healthcare software. It recently partnered with NantHealth (in which it holds a minority stake) to further develop and secure the latter's cloud-based operating system, which connects more than 16,000 medical devices to record over 3 billion patients' vital signs per year and is installed in 250 hospitals. Long term, BlackBerry could develop IoT to connect blood pressure or electrocardiograph machines to doctors' smartphones.

BlackBerry's recent earnings call noted that the company is the only mobile solution provider to achieve the full operational capability certification to run on the Department of Defense network. This underlying strength in security will continue to be a major focus as BlackBerry looks to expand its business with enterprises, government clients, healthcare, and regulated industries. Three sources in Blueshift Research's March 4 NSA report mentioned BlackBerry as a potential beneficiary of security measures that companies may take to secure data, as many consider BlackBerry's platform more secure than Apple's iOS or Google Inc.'s (GOOG) Android. That same report also found a shift in market share away from U.S. cloud companies over security concerns.

Current Research

Blueshift Research assessed whether BlackBerry will be able to leverage its QNX technology as a significant contributor to overall revenue and as a replacement for lost hardware revenue. We employed our pattern mining approach to establish six independent silos, comprising 25 primary sources and five relevant secondary sources focused on the wide variety of QNX clients and competition within the IoT space:
1) Automotive IT executives (9)
2) Healthcare IT executives (3)
3) IoT executives/software engineers (2)
4) Software engineers (8)
5) Software security experts (3)
6) Secondary sources (5)

Next Steps

Blueshift Research will monitor the adoption of Linux in the auto, healthcare and IoT fields. We also will monitor Apple's and Google's use and integration of BlackBerry's QNX as well as potential fields in which the technology could grow its share.

Silos

1) Automotive IT Executives

All nine sources see growth potential for BlackBerry's QNX in the auto market for the next five years. Of the sources who commented on pricing, three expect QNX to maintain its pricing power, one said the auto companies are in control of prices, while a fifth source said QNX's prices would rise initially if BlackBerry were to sell the company. One source believes Cisco will buy QNX. Areas of potential growth for QNX includes manufacturing, industrial applications, intravehicle connectivity, military and agriculture.

<u>KEY SILO FINDINGS</u>

Growth Potential
- – All 9 sources see growth potential for BlackBerry's QNX in the auto market over next 5 years.
- – 1 source believes Cisco could buy QNX.

Pricing
- – 3 sources believe QNX holds pricing power.
- – 1 believes the auto companies control prices.
- – 1 said pricing would increase initially if QNX were sold.

Market Share
- – All 9 said QNX has a majority of share in the auto market.
- – 1 source said Google and Apple are encroaching.

Additional Revenue Streams
- – Manufacturing, industrial, intravehicle connectivity, military and agriculture could be new markets for QNX.

1. Vice president of product and technology for a major U.S. auto manufacturer

QNX controls at least 50% of the automobile RTOS industry. The source's company is exploring the use of QNX in factory machinery. QNX will continue to grow with or without BlackBerry and may be sold off to another entity. Licensing is QNX's core money maker; its actual products are competitively priced. Microsoft is a competitor and Apple likely soon will be, but QNX offers real-time processing and operates more efficiently than any other available product. Although QNX's growth prospects appear to be significant for the near term, five years out is harder to predict given the rapid evolution of microprocessing software.

Growth Potential
- ▪ "Our use of QNX is probably going to increase as applications for the technology keep expanding. Looking out five years, if no real alternative comes on the market, we'll probably see all new cars using some form of this technology."
- ▪ "Microsoft could give QNX a hard time, but right now QNX doesn't have any serious competition."
- ▪ "I suspect QNX will develop many other applications for using this technology, everything from under the hood to under the dash. Five years is a long time to predict the staying power of any technology, but QNX is a known quantity."

Pricing

- "Licensing is probably where QNX makes their money. The products are competitively priced, but one advantage is QNX offers security and it's smaller in terms of coding. System calls are more efficient. The performance is better than anything else available."
- "BlackBerry's pricing may turn out irrelevant. I won't be surprised if QNX is sold. There are plenty of companies that could make that acquisition. Given BlackBerry's troubles, that may be on the horizon. Whoever owns QNX can probably set prices until an equally effective product becomes available."

Market Share
- "I'd say better than half the automotive market is controlled by QNX."
- "Again, Microsoft is a competitor in this space, but QNX still has the better solution. We are always studying this space to see what's coming next. I can't say there's anything out there right now that offers real-time processing capability to the same level."
- "Apple will release something to compete with QNX."

Additional Revenue Streams
- "QNX could expand into military applications and 'routinized' devices like precision industrial machinery."
- "We are looking at additional opportunities for using QNX in the manufacturing process—not just in our vehicles but the machinery used to build them."

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>
> *VP of Product & Technology*
> *Major U.S. Auto Manufacturer*

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2. Vice president of supply chain management for a major U.S. auto manufacturer

QNX will enjoy strong growth for the next two to three years but then could face serious competition because of evolutionary advances in software and microprocessing. Microsoft wants to expand in the space for dashboard applications, while Apple, Green Hills Software Inc. and Google's Android almost certainly will bring more powerful products to market. BlackBerry's future seems dubious, but QNX will continue, likely as an acquisition by a major U.S. auto manufacturer.

Growth Potential
- "All of our new luxury vehicles use QNX to varying degrees in different applications. All the major car makers employ QNX to manage dashboard systems, backup cameras, engine monitoring; it's everywhere."
- "Five years is a long time to lead in the software business. QNX will likely remain the leader for at least another two to three years, but technology evolves in leaps and bounds. In five years, most—maybe all—new cars will contain QNX or a competing processing technology."
- "QNX faces no major competition right now."

Pricing
- "Upfront costs are not so much the issue as the cost to license the technology. That has to be factored into how we build cars and set pricing for them. From a competitive standpoint, the licensing costs are essentially the same for any manufacturer working with QNX, so it's not like any single company is at a disadvantage in dealing with them. We all pay licensing fees."
- "QNX is probably the main thing keeping BlackBerry afloat. QNX will very likely be sold as the folks at BlackBerry decide what to do. If it is sold, I would expect some shakeup in the pricing short term, say a 5% increase, for maybe a year or until something else comes out that can compete."

Market Share
- "QNX is a part of at least half the new cars sold today."
- "QNX as a value proposition has no serious competition at the moment. You can bet that will change, and we [car makers] should be in a position to take advantage of that. But it's not all about pricing. QNX is highly regarded in this industry. They would have to fumble badly to change that perception."

Additional Revenue Streams

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> *VP of Supply Chain Management*
> *Major U.S. Auto Manufacturer*

- "There will be more ways to apply QNX to engine systems in cars and trucks. As these systems become more sophisticated, we need fast, efficient processing capabilities to manage everything the car must be capable of doing."
- "QNX really does an excellent job of automating complex processes in real time. I think it could find use in heavy industrial and manufacturing facilities. It would be a prime target for acquisition by any major manufacturing operation. I've heard GM and Ford are interested in a deal if BlackBerry decides to sell QNX. BlackBerry may not have a choice."
- "There are opportunities in the connectivity space. The question is whether QNX can deliver on price and value in ways that Android and Apple do not."

3. IT executive with a focus on automotive technologies

QNX will continue to thrive with or without BlackBerry, but it would be better off if acquired by another tech company. QNX delivers excellent products and ongoing support, with predictable revenue streams from licensing fees. The company should continue to see growth in the automotive sector because its products are pervasive and vehicle manufacturers are dependent on its technology. QNX also has a solid footing in the healthcare industry, but turnover for diagnostic equipment is much longer than for automobiles. QNX could find new revenue streams in high-tech industrial applications.

Growth Potential
- "QNX is a constantly innovating company. They'll be growing for at least the next five years. Software development is such a fluid and constantly evolving field, so it's certainly possible that a competitor could develop comparable real-time processing systems. But then there's the question of market penetration. QNX is firmly established."
- "You've got [Intel Corp.'s/INTC] Wind River in the medical space and they're trying to grow that market, but QNX really doesn't have anyone breathing down their neck on the automotive side."
- "Linux right now cannot compete for QNX business. Storage space is much larger than QNX, which also delivers in real time. Linux is not an issue for QNX."
- "The best thing that could happen to QNX would be for BlackBerry to sell it. That gives BlackBerry a serious infusion of capital, and QNX gets to move out of BlackBerry's shadow. … QNX would make a sweet addition to any major tech company. Cisco is probably at the top of that list. I've also heard some of the automotive giants are interested in doing a deal [acquisition]."

Pricing
- N/A

Market Share
- "They have a majority of the automotive business and probably close to a majority on the medical side."

Additional Revenue Streams
- "They could do very well in any industry that requires this type of embedded tech. QNX supports almost all open standards for mobile apps, so there is real opportunity in connectivity. I would bet they're pushing hard for military contracts too."

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>
> *IT Executive*
> *Focus on Automotive Technologies*

4. Automobile company engineer based in the Midwest and specializing in embedded automotive safety systems

QNX is a technically superior embedded OS and has considerable share of the automotive RTOS market. However, automotive design decisions usually are based on other factors such as cost and marketing, so the source was hesitant to predict whether QNX has staying power or growth potential. Pricing is critical because of the industry's high volumes, and suppliers are engaged in cutthroat competition. V2X connectivity is an area of growth for QNX. Linux currently rules the V2X space, but OEMs are hesitant to use it.

Growth Potential

- "QNX has staying power simply due to the technical advantages, but that doesn't mean that it will continue to be successful. Because technology evolves so fast, it is too difficult to predict."
- "Cost is such a big factor in the automotive industry, and marketing plays a big part in the decisions."
- "The biggest direct competitor is Linux, which has the advantage of a large ecosystem and the initially lower cost as 'free' software. I say 'initially' because of the hidden costs, which are many and usually not very well understood. Technically speaking, QNX is light years ahead of Linux as a real-time embedded OS, where Linux wasn't designed for that type of application. Real-time extensions were added to Linux but, as with any change to a design, come up a bit short. Linux can best be described as a 'soft' real-time OS, where QNX is a 'hard' real-time OS."
- "The QNX microkernel architecture isolates all hardware drivers from one another so that one malfunctioning piece of hardware or software is better contained, whereas the Linux kernel includes all hardware drivers in a common unprotected memory space [in which a malfunctioning piece of hardware or software could corrupt other things, including the OS' integrity]."
- "The cost for Linux can appear much lower than it really is. In efforts to simply survive, suppliers are betting the farm on engineering design work being done in the low-cost centers [Mexico, India and China] and, not realizing the level of Linux expertise necessary to successfully deliver a product, often struggle to produce good quality. Without in-house expertise, it is necessary to pay for support. Linux also has the threat of software patent litigation hanging over it."
- "I wouldn't call Microsoft a serious competitor in the automotive world due to cost, a lack of desktop compatibility need, a lack of technical advantages and, most importantly, a lack of a consistent roadmap [with too many changes to the product without backward compatibility]."

Pricing
- N/A

Market Share
- "QNX has a pretty decent size share of some automotive products, such as in-vehicle infotainment systems, but I wouldn't think they have the largest market share by any measure."

Additional Revenue Streams
- "Some suppliers are considering [QNX] for V2X connectivity due to the safety-critical nature of the technology. If V2X becomes mandated by the USDOT, it could provide a significant opportunity for growth of QNX. Europe is voluntarily rolling out V2X, but I don't know much about how QNX is utilized or viewed in that region. Linux currently rules V2X tech, but OEMs are hesitant to use it for such a product."

5. Engineer based in Canada and specializing in real-time embedded systems

QNX has about 50% of the infotainment market and can maintain and even grow share by leveraging its advantages into future auto industry applications. These include downloading "on the fly" and connectivity features that will be available in most cars by 2017. Other pluses for QNX are the time-criticality of its automobile applications and its lack of a significant competitor.

Growth Potential
- "QNX has staying power. There will be a platform that's part of the infotainment system where you can download applications on the fly in your car. QNX is ahead of other companies because it makes it possible to do that."
- "From a software development perspective, it allows you to create applications using the standard HTML5 format. QNX makes it easy for developers. They don't need to know much about the car itself; all they need is HTML5."
- "Based on the QNX car platform, I think QNX has staying power. The competitors are there, but they won't drive QNX out of the industry in the near future."
- "Microsoft also tried their luck in the infotainment industry, but most of the companies I know have switched to QNX."
- "QNX will have to improve their platform because the automobile industry is going in a direction where they want to enable users to download applications on the fly, just like on a smartphone from the app store. It can be done currently but not on the fly, but this is what automotive companies are looking for now."

Pricing
- "QNX is supplying this solution not only to high-end cars such as Mercedes or BMW [but] also in lower-priced cars such as Toyota Camry and Honda Accord, [which] means they're dealing with the pricing situation pretty well."

Market Share
- "I think QNX has 50% of the infotainment market share already."

Additional Revenue Streams
- "By 2017, it will be standard that there will be communication between cars and maybe with traffic signals. Any company that will leverage such technology before others will definitely have an edge. QNX will also be looking at how they can incorporate such things in their infotainment. This will allow you to have Internet on the fly in your car. It will be the same wireless standard. There might even be an 'Internet of Cars.'"
- "A lot of things will be done through the infotainment system of the car because they are the systems that can leverage the most from the functionality provided. I think QNX will also definitely be looking into that."
- "In the long term, this is something that's going to be established as a standard. It's not going to be optional. QNX is ahead on this, so they will have an edge."
- "The QNX solution has been around for many years, and it's very good with time-criticality. Automotive applications are time-critical: Whatever a software is supposed to do, it's supposed to do it in a particular amount of time. Otherwise there can be a major catastrophe. QNX has a major advantage in its OS being so efficient. That's why it's such a natural fit for automotive applications."

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>
> *Engineer Based in Canada*
> *Real-time Embedded Systems Specialty*

6. IT executive with a focus on automotive HD radio technologies

QNX remains the clear leader in small-kernel process applications and will continue to be for at least the next three years based on its negligible competition and the auto industry's recognition of its product reliability. QNX also will continue growing its business in the healthcare sector as advances in diagnostic equipment place greater demands on processing management. QNX is BlackBerry's single best asset but may be sold to recapitalize the latter's focus on its network and messaging business.

Growth Potential
- "There is no reason why QNX should not dominate in the automotive industry for its core products. They have a reputation for great support, product reliability, and they are known throughout the industry."
- "Diagnostic equipment for hospitals doesn't rotate out as frequently, so QNX will rely on licensing fees and maybe upgrades."
- "QNX operates on such a small kernel and manages processing tasks in real time so efficiently that no one can match them—not Microsoft and certainly not Linux."

Pricing
- N/A

Market Share
- "They own the automotive market."
- "They are well respected in the healthcare community."

Additional Revenue Streams
- "Automotive applications [are] a good growth area. Connectivity and onboard infotainment systems are gaining traction with car buyers, and the options are becoming more affordable. Connectivity in general is a growth market. QNX can be embedded with many mobile apps, and those are coming online all the time."

7. Technology specialist based in Canada and specializing in automotive and embedded systems

QNX has growth potential in ADAS (advanced driver assistance systems) as the industry progresses toward autonomous cars. Genivi, an alliance of Linux open-source users, suffers from a lack of cooperation between members. The entrance of Google and Apple into the automotive space could be viewed as a threat, but QNX already has done automotive work with these two companies. QNX's presence in IoT is a natural fit because of its extensive work in telematics and other connected-vehicle services. Also, QNX is involved on the infrastructure back-end side of IoT through its industrial automation work, including in the power grid.

Growth Potential

- "QNX has been around for a long time, and they've been able to adapt the real-time operating system that has been their core. They've migrated away from that as their only selling tool and only product. A lot of that is driven by the culture of innovation. They have the ability to adapt and focus on new markets and find new ways to make that grow."

- "Automotive is a very good initial target in IoT because there's already an established business through telematics and through other connected vehicle types of services. QNX is quite big in that and is the OS used in [GM's] OnStar system, the granddad of telematics. That's a natural for them in the M2M space, where they have a lot of expertise. From there, they are branching out to other areas like medical, home and the power grid."

- "In the power grid area, [QNX has] some large customers like GE … for the real-time aspects of their software."

- "They're in IoT on the infrastructure side rather than the at-home side. They've been focused on the industrial aspect, the larger customer rather than the consumer aspect."

- "The region for growth in automotive would be ADAS, things like blind-spot detection or lane departure warnings, all the things that are advanced safety features that are helping pave the way toward autonomous."

- "Linux might not be the competition in the IoT space. There's a wide range of processors things run on, and Linux will only run on a certain kind of processor or above because it has a lot of requirements on memory and CPU. A lot of the things you put into very tiny devices can't afford to have large processors. QNX has that same challenge to a small extent, but it can get a lot smaller than Linux can for the equivalent size because it's a microkernel. Linux won't have as big a footprint in M2M as a lot of people think."

- "There are companies doing things in the M2M space, like Aeris, but there are also a number of other companies doing M2M. AllJoyn is a collaboration of different companies interested in M2M, Qualcomm being one of the main drivers, because it makes the chips used in M2M. The companies in that alliance are the potential competitors."

- "Genivi, an open-source Linux alliance, has been predicted as taking over share from QNX in the automotive space. There are also others, like ITRON from Japan, primarily focused on aftermarket."

- "For Genivi, the run-time licensing is free. But the companies that are providing Genivi solutions are not doing it for charity, so the total cost of ownership or services side can be a lot more."

- "The Genivi area is complicated. A lot of industry outsiders look at it and think it's taking over because it's free. But it's important to understand it's a collaboration between car companies and car companies don't collaborate well together. There have been a number of collaborative efforts in the past. What tends to happen is they all want to differentiate, and then they're afraid to put in contributions into that organization though they're all willing to take something out and change it to make it their own thing that's unique. That's the problem that Genivi has faced until now because the OEMs don't have a way to differentiate. On QNX, because it's proprietary, they don't have to share the work they do with anyone else. … Even if QNX charges for things that Linux would call 'free,' the OEMs are willing to go with it."

- "Microsoft is on their way out where they recently lost the Ford business to QNX. Fiat is probably now one of Microsoft's only big customers."

- "Another big factor in automotive and entertainment is the entrance of Google and Apple in that space. That will potentially change how that space looks and who the players are because they're dominant players elsewhere and the OEMs will want to court them. But QNX has definite advantages there as well. It has a tremendous amount of experience in the automotive side and in terms of integration. They're doing the back-end part for Apple in integration, and because they work with Google they can do systems with components from both. And because they've been able to get the Android technology from BlackBerry means they have their own Android solution. It's not clear what will happen there, but they do have an ability to cover most of the bases even in that market where things are likely going to be changing."

- "I believe that the way [BlackBerry CEO] John Chen appears to operate the business seem quite intelligent: If it's not making money, get rid of it. QNX has been very successful at continuing to make revenue even though other parts of the organization were not. Some people have said the best idea would be to spin QNX off and try to do that

> QNX has been around for a long time, and they've been able to adapt the real-time operating system that has been their core. They have the ability to adapt and focus on new markets and find new ways to make that grow.
>
> *Technology Specialist, Automotive & Embedded Systems Specialty*

separately. I don't see that happening because right now that's where a lot of their value is, and their software expertise and their upcoming value too. I think they will keep QNX to the bitter end."

Pricing

- "In terms of pricing, auto companies always seem to have the upper hand. … It's challenging, but QNX has been able to offer competitive value in that area. … QNX has gained enough of an advantage to not be squished down to the lowest common denominator."
- "QNX has spun off a division called QNX Cloud. The focus is to do a cloud-based business specifically for IoT. They're going to focus on the back-end and services business, not on the run-time licensing business. They know that's a price-sensitive market."
- "The traditional business of making money off of run-time licenses is a different angle in the M2M play, a different market. A lot more volume is needed. The run-time pricing doesn't actually work out."

Market Share

- "A couple of years ago they shared publicly they had 62% share in the infotainment and telematics market."

Additional Revenue Streams

- "Automotive is the biggest chunk for QNX, industrial automation is the second biggest chunk, and then the third would be other areas where they have a strong presence, like medical or networking."
- "QNX has been around for a long time, maybe some 30 years, so they have a well-established base in industrialization and medical and other areas besides automotive."
- "Industrial automation is another big part of the market where QNX has been very successful, historically. But it's very difficult to lump them all into the same bucket, not like automotive. They have a lot of business there but from a large number of different industries—like nuclear power plants, the space arm, windmills."
- "The other big area is medical, which is a natural space for M2M. That would be the next natural evolution of a cloud-based product."

8. Technology specialist based in the Midwest and focused on embedded technology and the automobile industry

QNX has a strong standing in the automobile industry and an opportunity to grow in the connected space because of its robust microkernel architecture. However, it faces serious competition from such companies as Wind River's VxWorks, Green Hills' Integrity, Google's Android and possibly Apple. More competition may come from customized Linux models such as those built in Tesla cars. Although BlackBerry likely will disappear, QNX will survive and will be the object of a significant bidding war between the likes of GM and Ford.

Growth Potential

- "I don't see QNX as interchangeable with BlackBerry. I see them very differently. I think BlackBerry will cease to exist as a company in short order. It might become an intellectual property house, and I think it will start selling off assets pretty soon, in the next 12 to 18 months. And one of the most important assets it could sell would be QNX. I've studied the question of what that could mean for companies using QNX, knowing that QNX is housed within BlackBerry. Companies using QNX have to be confident that QNX will be there even if BlackBerry goes under. They look at QNX as a separate operation from BlackBerry. QNX's Neutrino is a very well-regarded, highly reliable, real-time operating system in the automobile space that is also in engines, motors and other places. QNX is a pretty good company."
- "Does QNX have the capability to survive? I think they do. If BlackBerry were going out of business, I think you'd see a bidding war for QNX from the likes of GM and Ford."

Pricing

- "You don't need QNX's premium-priced products for anything really. You can build a hand unit on Linux, Microsoft Win[dows] CE or [Green Hills'] Integrity, also a real-time OS. But people like QNX's offering because it's small, it has a space advantage, and it's resilient and real-time. There's a lot of value prop to it. For IoT, Linux or other alternatives will do fine. Given its architecture, how do you strip Linux down to be sufficiently small enough so that you operate as robustly and as resiliently as possible? Linux as a kernel is fairly big in comparison to QNX's kernel. What you're looking for is a reasonable price point and resiliency. They could compete. In IoT, they will have a huge issue."
- "They have a typical OS model. They give you a flat functionality if you bid a job. From there they'll price delta, and on an ongoing basis there's a license fee. Their business model is incumbent on continued licensing."

Market Share

- "In the infotainment space and the head unit space, QNX has competition from Microsoft with their WinCE product, which is in a lot of vehicles. They have competition from Green Hills with a product called Integrity, which is very similar, with a microkernel. Green Hills cut their teeth with military stuff. … The third competitor would be Linux itself. You also have VxWorks from Wind River, another real-time OS. … The new guys on the block would be Google, which has indicated they have serious interest in getting in there, and then Apple."
- "Over time you might see the Tesla model where they'll take Linux and start customizing it significantly because Linux has zero licensing cost. As more companies recognize that what they're building is a vehicle to transfer software, more will become software-savvy and will also the learn the value of doing software design and development and integrate them into Linux. I think Linux is the long-term competition. In the short term, it's VxWorks and Integrity."

Additional Revenue Streams

- "They're also making a play into the Internet of Things. Any device that has a microprocessor and has memory is eligible for QNX. As a microkernel-type architecture, it's small—much smaller than Linux—and real-time so it's deterministic. … I think as a technology firm they have a bright future. It's just the uncertainty behind the parent company; we have to figure out what will happen there."
- "It's unlikely that QNX will grow with BlackBerry and unlikely if they'll grow in the handset space overall. Other than that, you have automobiles, industrial systems—factory controls, tank automation and what they started with, the automotive control space. They're also in the dashboard panels, rearview cameras. They have a resilient robust portfolio all predicated on embedded, real-time deterministic software."
- "BlackBerry built connected devices. A number of people resources are known to have been transferred from traditional BlackBerry to QNX. Some in the industry speculate that it's in anticipation of a spinoff or letting go of the asset. Others argue that it's strategic thinking on the part of BlackBerry, recognizing that the connected days limited to their devices only are finished and that QNX might best serve in connectivity."

> "Any device that has a microprocessor and has memory is eligible for QNX. As a microkernel-type architecture, it's small—much smaller than Linux—and real-time so it's deterministic. … I think as a technology firm they have a bright future.
>
> *Technology Specialist, Embedded Technology & Automobile Specialty*

9. Auto manufacturer engineer specializing in telematics and infotainment

QNX has a significant chunk of the premium OEM market in infotainment, but this sector is being entered by Apple and Google, which could be thinking of acquiring QNX. QNX's RTOS gives it a significant advantage in the telematics space, in which response time is critical. However, these RTOS features also could be developed by other companies, such as Apple, Google or even Samsung Electronics Co. Ltd. (KRX:005930). The military could be an additional revenue stream for QNX. IoT probably will make do with Linux for most consumer applications.

Growth Potential

- "QNX is growing, and it is one of the premium solutions for automotive use. … QNX is the off-the-shelf solution of choice for a lot of new technology implementation. It has processing power and capability in terms of OS, for a quick turnaround solution."
- "Both Google and Apple are using QNX in infotainment systems. You can have Android on top of QNX, and you can have iOS in the car with Apple's CarPlay right on top of QNX, which a lot of the OEMs have."
- "In the automotive space, the piece QNX currently has is being threatened by the likes of Apple and Google."
- "One of the major areas they have grown in and have a lot of power in is the connected infotainment area, and that's one area that both Apple and Google are starting to really encroach. It would make sense for either to buy the company because they're the competitors."
- "The key distinction for QNX is RTOS, which Apple and Google do not have. It's technically not a requirement for infotainment, but for anything other than that, they simply cannot compete. The consumer-connected space and

> "The key distinction for QNX is RTOS, which Apple and Google do not have.
>
> *Auto Manufacturer Engineer Telematics & Infotainment Specialty*

infotainment place where Apple and Google want to play in the automotive industry, which overlaps with QNX—that's a space where QNX for the most part has an advantage in terms of a larger ecosystem of connected devices."

- "In terms of RTOS, QNX has an advantage. Other than in infotainment, a lot of the devices have to be RTOS. Even infotainment is RTOS, but the requirements are not as stringent as for some of the other devices."
- "In automotive there are requirements in terms of response time not necessary in consumer devices. A phone can just be reset. That's not applicable for automotive. And on top of that, automotive has to last for 10 years. You technically can't have a consumer device in automotive. That's where QNX has advantages over Apple and Google. There's a huge gap between what Apple and Google can do and what QNX can do."
- "RTOS is available from different vendors and in proprietary implementations. Some are even Linux-based, which is freeware. Smartphones have made the interface interactive, with the graphics and all the processing power that goes with it and making all that happen seamlessly. Google and Apple brought it to the front with their smartphones to the consumer. QNX has built some capability to support those kinds of features and functionalities as well, on top of RTOS. I don't think there are too many competitors in that."
- "I don't think BlackBerry can survive as a company as a whole, but QNX might be the only piece that's viable. It would make sense for them to sell it to Google."

Pricing
- "QNX is premium as compared to competitors, but they charge for it."
- "As long as they keep innovating and remain at the cutting edge of the solutions, they have an [pricing] advantage."

Market Share
- "I believe they have a significant chunk of the premium OEM market, but they are being encroached by Apple and Google so it's not something they can easily hold on to."

Additional Revenue Streams
- "Other future uses besides infotainment and telematics are in autonomous vehicles. To put that kind of technology together requires a lot of real-time, fairly advanced sensors—embedded devices that need to communicate."
- "You're already seeing pieces of self-driving cars—autonomous features or semi-autonomous features. Those are also examples that require very precise fail-safe calculations. It's not an option to reset those devices. You need precise and reliable response times. And QNX has an advantage there because of RTOS."
- "But even RTOS is not insurmountable in terms of someone else developing that. Tomorrow, someone with the resources of Apple and Google or even Samsung could decide to play in that space in terms of resources for development. Like Google did on top of Linux, they could build on top of a stack that's available and put something together. What QNX has is not bullet-proof."
- "In IoT, you don't want to use a lot of processing power, which QNX needs. That processing power is premium, and for IoT, Linux is enough."
- "There are uses in the military, for instance. They'd be willing to pay for robustness and reliability. It's one thing to have sensors for consumers but another to have them be rugged and last awhile."
- "For agriculture also, there's potential for connected sensors, and they could come up with a variant of QNX that has a limited number of features and is not as expensive. QNX could definitely do that. When you buy QNX, they give you all the drivers, but not all the drivers are necessary. You could have a slice, then charge by the slice and make money on volume, which is what IoT is supposed to be."

2) Healthcare IT Executives

All three sources believe BlackBerry's QNX has staying power in the healthcare industry. Two expect QNX's pricing to increase about 25% during the next five years. The third source said pricing will depend on volume. One source said QNX has 60% market, followed by Wind River. Another stated that QNX owns at least half the U.S. and Canadian medical RTOS markets. Additional revenue streams could come from use in air emissions measurements and ophthalmologic equipment.

KEY SILO FINDINGS
Growth Potential
- 1 believes QNX provides better support than Microsoft and, hence, has staying power. Cisco could buy QNX.
- 2 others also said QNX has staying power.

Pricing
- 1 said pricing could increase 20% to 25% during next 5 years based on the lack of real competition.
- 1 said prices could rise 5% to 6% per year and that medical community would accept the increase.
- 1 said pricing depends on volume.

Market Share
- 1 said QNX has 60% of medical market, followed by Wind River.
- 1 said QNX owns at least half the U.S. and Canadian medical RTOS markets.

Additional Revenue Streams
- Air emissions measurements and ophthalmologic diagnostic and treatment equipment are potential areas of expansion for QNX.

1. California-based software engineer with expertise in real-time embedded applications in medical devices

QNX has staying power based on the quality of its offerings and the tools it supports, especially in the real-time area. It has competitors, including Wind River's VxWorks, but Microsoft has proven to be unreliable in supporting older technologies. Cisco may be interested in acquiring QNX because it is a big user of the technology.

Growth Potential
- "QNX has staying power based on the support it provides, even for older versions. This is not true of Microsoft, which forced a device maker to go from NT/2000 to XP because they stopped supporting it."
- "Medical devices have a very long lifetime, and having that support going back to previous versions is very important."
- "I suspect VxWorks is also like QNX in supporting older versions. Companies that are really focused on embedded software have to have that kind of commitment to supporting old versions. But I think Microsoft can be eliminated from the competition because of its lack of support."
- "Micrium [Inc.] is another company in that space in medical devices. Sometimes a medical device company will choose an operating system based on the developers it employs initially and what they're familiar with."
- "Larger companies tend to be sensitive to the issues of FDA certification. Small companies are more focused on getting devices off the ground and worry about certification later."
- "I have no doubt that QNX will maintain its importance over the next five years."
- "There are competitors out there, but I'm impressed by the quality of the QNX offering and the quality of the tools they support to go with it, especially in the real-time area."
- "QNX seems to have a solid opportunity based on what I'm seeing, but a lot of it depends on how BlackBerry manages it."
- "I heard speculation that when Harman [International Industries Ltd./HAR] sold QNX to BlackBerry, they put in a clause that if BlackBerry ever sold QNX, Harman would get right of first refusal. I don't know if that's really true, but that's how heavily involved Harman was. I also wouldn't be surprised if Cisco were interested in picking them up if they're ever on the market because they're so heavily invested. But that's just speculation."

Pricing
- "They have different pricing levels depending on volume. Price per unit if you're dealing with millions of units, such as in automobiles, will be low. If it's in the thousands, as in some medical devices, of course it's different. But that would be true of any embedded system: different pricing depending on volume."

Market Share
- N/A

Additional Revenue Streams
- "QNX is also used in embedded systems that do measurements for clean air emissions, though the real-time aspects are not essential and other operating systems could be used as well."

> QNX has staying power based on the support it provides, even for older versions. This is not true of Microsoft, which forced a device maker to go from NT/2000 to XP because they stopped supporting it.
>
> *California-based Software Engineer w/ Real-time Embedded Applications Expertise*

2. VP of a private Florida hospital

Pricing on QNX products will climb as much as 25% in the next five years as the company has no meaningful competition. QNX controls perhaps 60% of the medical diagnostic market, and healthcare's use of the technology is expected to grow as medical advances move in line with technological advances. QNX integrates smoothly with this hospital's diagnostic and networking systems. The hospital pays the quoted price, which this source believes is equal to the technology's value. QNX operates efficiently, which also plays into purchasing decisions.

Growth Potential
- "Medical advances move with technological advances. The QNX operating systems are state-of-the-art, and I see no reason why they would not evolve and adapt to meet the changing needs of their customers."

Pricing
- "[Pricing] will increase over five years, probably 20% to 25% in that time, based on our experience. They don't have any serious competition right now."
- "I think the price is what it is. Their products integrate pretty smoothly with our systems, so there's that efficiency factor. Hard to put a price on that."
- "Unless there's a significant competitive threat, BlackBerry or QNX could raise prices maybe 5% a year."

Market Share
- "QNX probably has 60% of this market, then Wind River. The rest would be highly specialized niche companies."
- "Wind River is making some inroads into medical devices. We hear their name more often. For now, QNX seems to hold the majority of the medical diagnostics market. Their systems integrate well and work as promised. That's critically important to us. We're all tasked with identifying ways to improve operational efficiency, so I'd say we are pleased with their products."
- "Only Wind River seems to be pushing harder into medical diagnostics. Possibly Microsoft and Green Hills, although they go more for consumer business."

Additional Revenue Streams
- "We would certainly look at any upgrades or improvements as they are presented, depending on our needs and how they match up with the capabilities of the software system. QNX has some applications for ophthalmologic diagnostic and treatment equipment."

> "[Pricing] will increase over five years, probably 20% to 25% in that time, based on our experience. They don't have any serious competition right now. ... Their products integrate pretty smoothly with our systems, so there's that efficiency factor. Hard to put a price on that.
>
> *VP of a Private Florida Hospital*

3. Hospital COO in Florida

QNX holds more than 50% of the healthcare RTOS market and likely will continue to dominate it. However, being owned by BlackBerry is a concern. QNX will be able to increase pricing by 5% to 6% per year during the next five years unless an equally effective alternative becomes available.

Growth Potential
- "I know QNX works with medical advisors on identifying new ways to use the technology so they stay ahead of the curve."
- "One uncertainty for QNX is how they continue to operate under BlackBerry or whether BlackBerry sells them off. Selling QNX might be best for both of them. That could create a more stable environment on the QNX side."

Pricing
- "Diagnostic equipment and peripherals go up every year, so there's no reason to believe QNX won't raise prices. They could go up 5% to 6% annually, and healthcare systems will probably go along with it. The technology interfaces pretty much in any way the IT folks need it to work, and it has become integral to many, many diagnostic devices."
- "We don't have any control over the pricing."

- "Without an alternative solution that might be more competitively priced—and it would have to demonstrate its efficacy—QNX can and almost certainly will raise prices. To a large extent, they can do this whenever new diagnostic devices become available."

Market Share
- "QNX owns at least half the U.S. and Canadian healthcare markets for their products."
- "I am familiar with Wind River, but they are a comparatively smaller player in software systems for healthcare."

Additional Revenue Streams
- N/A

3) IoT Executives/Software Engineers

One of these two sources said BlackBerry's QNX is important in the medical field. It also has room to grow in IoT, but so do Microsoft, Android and Linux. The other source said Linux is becoming more competitive through its lower price point but added that QNX offers more technical support, which allows it to demand a price premium. Additional areas for growth include mobile, high-reliability medical equipment, and the military.

KEY SILO FINDINGS

Growth Potential
- 1 said QNX is important in the medical market but that many are turning to Linux because it is less expensive.
- 1 said QNX has a growth opportunity in IoT.

Pricing
- 2 said QNX is more expensive than Linux but offers more support.

Market Share
- 1 said QNX has most market share in auto but can't survive on that. Recently it integrated with Apple.
- 1 reported significant growth opportunity in IoT but also cited competition from Microsoft, Linux and Android.

Additional Revenue Streams
- Possibilities exist in mobile, high-reliability medical market (such as EKG), military, wearable devices, home security.

1. Washington state consultant specializing in embedded systems and cloud services

IoT offers an opportunity for QNX despite competition from Microsoft, Linux and Android. QNX is the best-suited OS in the growing market of home medical devices and in home security. The software has opportunities in wearable devices, such as wristbands that can communicate with cell phones or independently as computers. QNX stands a better chance if BlackBerry maintains it as a separate division and allows it to flourish in all of its applications.

Growth Potential
- "You can separate the popular operating systems into QNX and the other ones. QNX has a different architecture—a microkernel that isolates drivers in applications differently than the other operating systems. You find it especially in areas where you have to have critical stability. You see it a lot in medical equipment and devices, real-time systems."
- "QNX is not necessarily the only operating system in there. Often, for example, they'll partition a medical device and have two processors running. QNX is the operating system for the critical part of the device, where they need FDA approval. Same in slot machines: There's a part of the machine that's highly regulated. But in these devices will often also be another processor running a UI interface, and that might be embedded Windows, Linux or Android, for user interactions that are less critical."
- "In a car, they might have QNX running the system and have another operating system doing the touch controls. And then you can have a dock for Apple or Android so you can enable those features as well."
- "Everybody wants into that automotive industry and to host the apps."
- "They're in a lot of medical devices, and there's a huge growing area in home health and in home automation. With the problems with Nest, you need a real-time operating system to control your house and not be affected by a crash of the iOS app and not be able to control your doors locking or alarm system. That's a growth area, and QNX would

be a good choice for that market, bringing their strengths of reliability and always being on to new devices that are controlling more of our homes."

- "With baby boomers retiring and not wanting to go into traditional nursing homes, there's a lot of effort to treat people at home. The devices need to connect to the Internet and record data in a secure and safe manner. You'd want something like QNX and a real-time operating system for that."

- "QNX is going to be around regardless of RIM because it has such a following. … It will depend on whether BlackBerry keeps it separate and allows it to flourish as a separate OS. If it wants it to become more exclusive with its products, then it will have a harder time thriving on its own. But the advantage of bringing it in is they wouldn't have to worry about all their other customers. They could bring it in and modify it in ways that satisfy their hardware requirements on BlackBerry, similar to the Apple model. They'd have complete control, and there's advantage to that. But they don't need to do that. They could enhance the QNX OS independently. They could add the features they need for their hardware and then provide it to everybody. It's not as if there are a lot of pure consumer devices on QNX so I don't see why they wouldn't continue with it."

Pricing

- "Nothing is really free, not even Android. … It's not really free because you have to do all the back-end stuff. And there are a lot of IP issues in there as well. That affects price."

- "The competition will bring down prices. In general, the operating systems are pretty competitive with each other. I don't see any of those guys getting pushed out because of price."

- "Eventually, with the modernization of the health system, there will be databases and systems that will be standardized. There will be cost savings in that, not just cost savings from the operating systems in the devices."

Market Share

- "There is growth in the automotive area in general, but the question is whether their market share could grow as well."

- "They could grow share in the Internet of Things. Even though we've been hearing about it forever, it's just starting to happen. QNX could do it there."

- "As competition in home automation and home health, you have Microsoft Windows CE's operating system, which is near real-time. Also, embedded Linux. Some devices will use Android as well. In the home too, you might see two processors. That's a little expensive for the home market. Instead, you could have the real-time OS doing a limited display to avoid the cost of another processor to run Windows, Android or iOS to create the interface. But all those operating systems can be in those devices."

- "Microsoft is taking the area of Internet of Things more seriously, and they're giving away the operating system for devices with small screens."

Additional Revenue Streams

- "There are many different types of wearable, wristband types of computers. They're connected to the smartphone you're carrying, and soon they will communicate directly without the smartphone. I think that's a growth area to watch for: the wearables market."

> **QNX is going to be around regardless of RIM because it has such a following. … It will depend on whether BlackBerry keeps it separate and allows it to flourish as a separate OS.**
>
> *Embedded Systems & Cloud Services Consultant*

2. Executive for a California engineering design company, expert in the real-time system architecture

Although QNX offers an excellent RTOS, its licensing cost will hold back growth in IoT. Also, QNX has a history of making poor strategic choices and has alienated third-party consultants by cannibalizing their business in the past. BlackBerry likely will not survive, but Apple may be interested in buying QNX. A good use for QNX would be in handsets because of the company's strength in distributed applications. Growth opportunities abound in medical devices that need to be highly reliable and in military applications.

Growth Potential

- "The features of QNX are that it's real-time and reliable. What kind of device that would connect up to IoT really needs hard real-time scheduling? I can't think of anything. If it can run Linux, why not put Linux on it? What's the clear competitive advantage of QNX in this space that would convince me to pay royalties over the perceived development headaches with Linux? I just don't see how they're going to play in that market."

- "Linux and NetBSD are the two big competitors."
- "QNX can be used in medical devices any monitoring device such as life monitoring or life support, where the operating system could and should run QNX because it's, bar none, the most reliable operating system."
- "As a designer faced with the problem of getting a product into market, one of the decisions I would face is QNX vs. Linux. It's becoming increasingly difficult for designers to choose QNX because it's expensive or perceived to be expensive."
- "I moved away from using QNX because when times got rough a few years ago, I helped QNX get in the automotive market. But when QNX started looking for more consulting opportunities, they started cannibalizing their third-party consultants. They went after the work that third-party consultants were living on. And they did it again a few years ago. I won't bring them into an opportunity unless it's absolutely necessary to use QNX, and there are very few cases that remain an absolute necessity for the feature set QNX brings to the table."
- "[QNX is] the most reliable operating system, the best real-time OS. But I can make do with Linux or NetBSD in the vast majority of opportunities. Even friends who are still doing QNX consulting are also a doing a lot of Linux as well. That's part of the problem I see with QNX getting market share back."
- "QNX has a history of making ... strategic blunders. They had an opportunity to put QNX on cell phones to replace Symbian two years before the iPhone; they turned that down. They have a history of chasing near-term short dollars instead of more strategic opportunities. Unless that changes, I don't see big growth for QNX."
- "With BlackBerry trying to survive on QNX, it's the blind leading the blind."
- "If I ruled the world, I would suggest Apple buy QNX. Forget RIM [Research In Motion]; let them fail. That would help iOS, which has a whole set of its own problems and could benefit from QNX. But I doubt Apple would be interested. I don't see Google as interested, and I don't think QNX would do well there. I think they need someone more strategic at the helm, more gutsy."

Pricing

- "QNX is expensive when you compare royalties to zero for Linux. Linux is free, but that doesn't mean there's zero cost in making that choice. You have no support whereas QNX as a company, with the right money, will support you."

Market Share

- "They had some competition from Microsoft and from Wind River with VxWorks, which is disappearing from the market. Most of the competition is from Windows CE in the automotive side. And more and more companies are using QNX. They've also completed an integration with the iPhone. But they can't survive just being an automotive company."

Additional Revenue Streams

- "QNX has a chance in the cell phone market. It's an awesome OS, especially for distributed applications. I can see applications moving between the car, the phone and places in the home. It's the right technology for that. The problem is I just don't see them getting there. They're challenged not by their technology but by their leadership and, today, by money."
- "If BlackBerry can get sales up, QNX has a chance. They can innovate on the technology faster than with any other OS. The question is, can they get enough momentum to compete with Apple and Google, who just throw money out there?"
- "I can see QNX fitting in military applications, also in high-reliability medical applications like in EKGs or other life-monitoring devices. In aviation too, they could do well. They never pushed into those markets. I can see a lot of places where QNX fits, but on the business side of things it rarely works out in their favor."
- "When they were bought by Harman, everybody thought it would give them a boost in automotive. Instead, it frightened away a lot of their industrial automation customers because they saw a focus away from industrial automation. The same thing happened when they were acquired by RIM."

> [QNX is] the most reliable operating system, the best real-time OS. But I can make do with Linux or NetBSD in the vast majority of opportunities. Even friends who are still doing QNX consulting are also a doing a lot of Linux as well. That's part of the problem I see with QNX getting market share back.
>
> *Executive*
> *California Engineering Design Company*

4) Software Engineers

Five of eight sources commented on BlackBerry's QNX in the auto market and believe the technology will grow during the next five years. Seven of the eight sources said QNX will continue to expand in the medical field, including one source who expects it grow 50% to 60% among hospitals in particular. One source, a Linux proponent, cited little reason to use QNX because Linux is less expensive and provides comparable features. Two sources said QNX holds pricing power, one predicted the company will increase its auto sector prices by 50% to 60% during the next five years, and two foresee pricing pressure as competition increases. QNX is the dominant player in the auto and healthcare sectors. Only the Linux proponent sees Linux as a leader in healthcare RTOS. Telecom (via Cisco), social media, industrial and military applications are future areas of growth for QNX.

KEY SILO FINDINGS

Growth Potential
- 5 sources see growth in auto market for QNX.
- 7 of 8 see growth for QNX in the healthcare sector, mainly due to its superior security features and FDA approval.
- 1 expects 50% to 60% growth for QNX in hospitals over the next 5 years.
- Microsoft is not a big threat in the healthcare sector.
- 1 Linux supporter sees little reason to use QNX over Linux.

Pricing
- 2 said prices will increase in the auto sector, including 1 source who expects a 50% to 60% hike over next 5 years.
- 2 said competitors are driving down prices.
- 1 cited the potential for competitors to drive down prices.
- 3 said QNX is able to charge a premium due to superior tech support.

Market Share
- No viable competitors were named in the auto sector, but 1 source said Microsoft is trying to compete.
- 2 said Wind River is a competitor in healthcare.
- 1 source said Linux is trying to take QNX share in the auto sector but its open-source OS remains a security concern.
- A Linux supporter believes Linux is taking share from QNX in all applications.

Additional Revenue Streams
- Social media, retail, military, inter-car networks, industrial and telecom growth (via Cisco) are areas full of potential for QNX.

1. Software engineer in northern Virginia

QNX faces competition primarily from Microsoft in the healthcare space, but both companies could see a 50% to 60% price hike during the next five years. QNX dominates the automotive sector, but this industry will work aggressively to control costs, which could open doors for competing software. QNX could realize an upside in online retail, high-speed routing and social media sites that must process massive amounts of data. QNX benefits retailers because it offers greater security than less-expensive, open-source software solutions.

Growth Potential
- "I expect the percent of hospitals using QNX will increase significantly because [QNX] has a wide range of applications in medical devices. I think it could go up at least 50% in the next five years. There's really nothing to compete with it except maybe Microsoft."
- "Linux developers would have to add more real-time multitasking capabilities before they could really compete, but I doubt medical companies would use open-source software in their equipment."
- "QNX is so efficient that unless someone can develop a better solution, which is always a possibility, it has staying power [in healthcare]. I don't think QNX developers will stop trying to improve it either."

> QNX is so efficient that unless someone can develop a better solution, which is always a possibility, it has staying power [in healthcare].
>
> *Software Engineer, Northern Virginia*

- "There is almost unlimited potential for QNX in the automobile industry. OnStar, navigation systems, instrument clusters, all of these components use QNX."
- "Again, there's no real competition on the horizon right now. The only problem I see is that the auto industry, as a whole, would probably resist reliance on a single software company."
- "Growth will come from automotive and router traffic as people demand more voice and video capabilities."

Pricing
- "QNX can set prices, within reason, in the automotive sector. I think they have to be more careful in selling the medical equipment market."
- "Prices will go up in the automotive sector over five years, maybe by 50% to 60%. It's harder to predict the medical sector. It depends on how Microsoft steps up and if any serious competition emerges. Right now I don't see anyone competing for medical equipment besides QNX and Microsoft."
- "Automotive and medical are very different in the sense that medical device companies usually don't have the same need for controlling costs from a competitive standpoint. Car manufacturers will be more likely to seek out favorable pricing, whether from QNX or a competitor that might step forward."

Market Share
- "QNX and Microsoft are the biggest players in healthcare devices."
- "QNX probably controls the automotive space right now."
- "Microsoft is not walking away from healthcare. They are probably the biggest competitive threat QNX faces in that space."

Additional Revenue Streams
- "Any piece of medical equipment that places high demand on processors can probably be improved with QNX for better operating efficiency. Question is, can Microsoft do it at least as well or cheaper?"
- "There's a big upside for online retail, companies that have to fulfill orders and track inventory on a wide range of merchandise. The key is security, and QNX delivers that. Also social media platforms that have to process and manage tremendous amounts of data 24/7. Facebook, Twitter, Google's YouTube also use QNX."

> **Prices will go up in the automotive sector over five years, maybe by 50% to 60%. It's harder to predict the medical sector. It depends on how Microsoft steps up and if any serious competition emerges. Right now I don't see anyone competing for medical equipment besides QNX and Microsoft.**

> **There's a big upside for online retail, companies that have to fulfill orders and track inventory on a wide range of merchandise. The key is security, and QNX delivers that. Also social media platforms that have to process and manage tremendous amounts of data 24/7. Facebook, Twitter, Google's YouTube also use QNX.**

Software Engineer, Northern Virginia

2. Midwest software developer with experience in embedded systems in healthcare, automotive and industrial

QNX has the potential for increasing its business in such areas as healthcare, automotive, heavy industrials and IoT because it is a well-developed and well-supported OS. Still, QNX faces heavy competition from Linux, which is basically free. In IoT, QNX's real-time capabilities are needed, but its millisecond response time might be too costly for such applications.

Growth Potential
- "QNX has staying power because it's a well-developed OS with all the features that you need. It's well supported."
- "The key to QNX's staying power is that it has to maintain good support networks, including staff and online support."
- "QNX has a potential for increasing their business in healthcare, but they're also in competition with Red Hat [Inc./RHT] Linux, for instance, which is basically free."
- "I don't know if the security concerns are all that big if you have a connected device. It's something to be concerned about, but there are a lot of ways to address the security issue, such as with good firewalls or not having the network open to the outside."
- "For something as basic as an operating system, if you have an engineer at one company who's familiar with it and uses it, when he moves on to another company that's choosing another operating system, he'll bring the one he's familiar with. This has increased the use of QNX."

Pricing

- "There are competitors to QNX that are very low priced, but they also have low support and probably low features. For QNX, if it wants to demand a premium price it has to support premium features and give premium support. … They could improve on some of their support level, but in general they have some of the premium features that are needed."

Market Share

- "QNX does have presence in healthcare, but I don't think they're dominant. One of the competitors in that area is Wind River, one of the bigger names."
- "Microsoft has tried to play in the connected vehicle space a little more. I feel they might be throwing more money into that."

Additional Revenue Streams

- "There's a lot of potential for a device that can diagnose itself and alert a network about it. In order to play in that [the IoT] space, [QNX] will have to have a relatively low cost to entry but have the connectivity features that generally go with the higher-end model. Maybe the real-time aspect wouldn't have to be as fast—minutes rather than milliseconds—but cost is going to be a huge determining factor."
- "A lot of the competition is going to be Linux because of the cost."
- "Industrials is another revenue stream for QNX. But here too Wind River is big. As is another operating system called Micrium, but it's not as well-supported."
- "In heavy industrials, real time is critical for example for railroads or shovels that are being used are in far-away places."
- "There are a lot of devices included in the Internet of Things that can use QNX. That will be a huge growth area."
- "QNX has good potential, but it can't let the BlackBerry problems drag it down. You have to be able to count on a support network for a guaranteed amount of time."

3. Software consultant based in Canada, specializing in design and integration, and real-time and embedded solutions

BlackBerry's history with QNX has been one of tension dating back to the time QNX was acquired. BlackBerry's success as a software company will depend on it improving its relations. In the auto industry, QNX is a leader but has price competition from open-source systems that might appeal to value-priced car makers. QNX also has good potential in the medical devices industry because of its FDA certification, which might have been too time-consuming for a small company like QNX to acquire but is easier for a big name company like BlackBerry to maintain. QNX could profit in the telecom industry, where its platform is used in Cisco's routers. Other potential QNX applications are the military, NASA and slot machines.

Growth Potential

- "RIM/BlackBerry started its life as a small startup, and key decisions were made by people who never expected to be scaled up to world leaders in mobile communications. Later on, those people become respected managers but totally blocked any further development due to a lack of vision and understanding."
- "QNX had little choice when the deal was made. The other option was to be purchased by Microsoft, which automatically meant the death of QNX products due to the rivalry with Windows Mobile."
- "Before QNX was acquired by RIM, it was run like a family business. The top management were like the grandparents."
- "This forced marriage caused a lot of tension from QNX executives and actually delayed the original intention of switching RIM devices to the QNX OS for more than two years."
- "The decision for BlackBerry to become a software company … my personal opinion is BlackBerry won't succeed in this. The integration of QNX in BlackBerry did not go well from the very beginning. The decision to acquire QNX was very sudden, and nobody was prepared for it. It takes time to establish relationships and open communications channels, and because QNX still has other customers besides BlackBerry, BlackBerry never got the primary attention during the integration process into the BlackBerry devices. It was a very

> " QNX is a leader in the auto industry so far, but its staying power depends on how toxic its parent company will be. So far BlackBerry has made a lot of things significantly more complicated and less efficient.
>
> *Cadadian Software Consultant Design/Integration & Real-time/Embedded Solutions Specialty*

painful process, and in the end RIM deployed its own engineers instead of having QNX doing it. All these issues have probably not been resolved yet."

- "I'm sure BlackBerry's top management is working very hard to resolve these problems. QNX was a very successful software venture, but I don't think the income QNX can generate by itself will be enough to support a huge company like BlackBerry, even now."
- "QNX is a leader in the auto industry so far, but its staying power depends on how toxic its parent company will be. So far BlackBerry has made a lot of things significantly more complicated and less efficient. BlackBerry executives introduced a lot unnecessarily bureaucracy and made problems for engineering."
- "Some people believe Linux is a universal drug for all software problems. This is … not true. Due to its size, complexity and feature set, Linux cannot be a 'hard real-time OS,' and for QNX this is exactly a sweet spot."
- "The level of security is more or less the same between secure and non-secure platforms. In the medical space, there's a need for certifiable devices, so in this case QNX would be preferable to the free Linux solution because of certification."
- "Medical devices are a good market for a big company like BlackBerry. FDA certification takes a long time, and they have a record of it."

Pricing
- "Competitors are driving down prices."

Market Share
- "ChibiOS and others like FreeRTOS are the competitors in the auto industry. They're basically free but have unverified and untested source codes and lack tech support. I would expect cheap automakers will jump on this."

Additional Revenue Streams
- "Almost all vehicles are becoming programmable. The next big thing is integration of all controllers and computers of a vehicle into a network and then connection through an inter-car network to other vehicles on the road and with the road infrastructure."

> **QNX has good potential growth in the telecom industry, for example, through their partnership with Cisco. All the routers at Cisco—which are their most expensive products— are run on QNX.**
>
> *Cadadian Software Consultant Design/Integration & Real-time/Embedded Solutions Specialty*

- "QNX has good potential growth in the telecom industry, for example, through their partnership with Cisco. All the routers at Cisco—which are their most expensive products—are run on QNX."
- "QNX also has a good exposure to the military and NASA."
- "Another application is gambling machines in casinos, and racing, which of course needs the real-time application. However, I don't think this is a growing area because of Linux, which is cheaper and can replace QNX."

4. Executive at a Canadian software development and consulting firm

BlackBerry could transform itself into a software company because QNX already is a turnkey operation with a solid and successful history. In the automotive market, QNX has the dominant share and is expected to grow because of its real-time characteristics that are unmatched by the competition. In healthcare, QNX has established a record of FDA approval in medical devices and is expected to grow based on the additional security provided by BlackBerry. Finally, QNX has a long history of use in industrial automation and control systems thanks to its real-time capabilities. BlackBerry and QNX together create a very powerful combination.

Growth Potential
- "When you add the BlackBerry software to what QNX does at the device level, you have a very powerful combination."
- "Of course, there's the uncertainty around BlackBerry. QNX's market is clear, and as long as they operate as their own company, there's nothing negative about them. They've grown by leaps and bounds. Because of their association with BlackBerry, nowadays they're getting a lot of press."
- "I would imagine BlackBerry could transition into a software company fairly quickly because they already have a turnkey operation in QNX. QNX has already been operating for 30 years. In automotive, it's been more recent, but they very quickly took a dominant lead in that space. They've been working in the medical community for over 20 years and will grow there first because they have the ear of a great number of medical device manufacturers, and second, BlackBerry brings security."

- "When you talk about patient records, patient files and confidential information and images, security is a big thing. QNX has the networking capabilities, and BlackBerry brings a brand that is regarded as highly secure."
- "QNX has a long history in automotive dating back to the time it was bought by Harman Kardon, which also owned Becker, a traditional brand in German car radios. Harmon Kardon wanted to jumpstart the push into automotive. This is why QNX is found in the vast majority of cars manufactured and why they have such a dominant position."
- "QNX will grow in the automotive sector. They are dominant already. QNX differs from any potential competition in a number of ways. First, because they already have the dominant market share. Second, certain characteristics of their software can't be matched by any competition because they are a real-time operating system."
- "A real-time operating system differs from Windows or Apple's iOS or Google's Android. It's a deterministic operating system that's fault-tolerant and a very intelligent bit of software that is required not only for radios but for other things in vehicles, like control systems."
- "A real-time operating system differs from others because it recognizes faults. If something goes awry in the system, it can reboot itself in a microsecond and just carry on from where it was."
- "You need a real-time operating system in industries like medical devices or nuclear power, where something catastrophic could happen if the system went awry. Windows, for example, couldn't be used in medical devices because of the time it takes to reboot. You could kill someone without a real-time operating system."
- "QNX will grow in the healthcare industry. Medical devices have to clear FDA approval, and QNX is very well known by the FDA and has been for many years. There are enough things that QNX have built their software into that is tailored to the FDA that gives them a good base and makes it so that I believe their market share will grow."
- "It's embedded software. QNX never really focused on content, for example like Apple. They weren't trying to be a consumer brand. They were quite happy to sell to their customers in a vast array of markets and verticals and those customers built the content they wanted on top."
- "Apple built an entire ecosystem, but BlackBerry … just didn't have the content. They couldn't compete. In this case, if they're working with Google and Apple to bring content to the automobile, it's not a bad thing for QNX. It just gives a lot more content and options to the auto manufacturers. And Apple and Android do not offer real-time operating system characteristics in their stack."

Pricing
- N/A

Market Share
- "QNX's position is so dominant that even Apple wouldn't try to tip the apple cart. It's easier for them to just work with QNX."
- "While QNX is dominant in the automotive space, there are other companies like Apple and Android that are looking to integrate in certain aspects into cars. I believe that QNX is going to continue to hold the dominant market share, but they are in a way giving up the user interface layer. In other words, QNX will continue to run under the covers in these infotainment systems, and there are major auto companies like Ford jumping onboard. I think they will continue to grow, but their place in the ecosystem is changing. If Apple will sit on top of QNX and take care of the user interface, then their position will change a bit, even if they will continue to be successful."
- "As far as competition in the automotive industry, there's the Genivi Alliance, an open-source platform that's being promoted by a number of companies such as Intel and some Linux companies. But I think they've already lost the war. QNX is so far ahead."
- "In the medical space, I have a gut feeling QNX is dominant in that too because of the work they've done to satisfy FDA requirements. But any real-time operating system will also be trying to get share in that space, companies like Green Hills, [Cavium Inc.'s/CAVM] MontaVista, [Intel's] Wind River. They would be competition."

Additional Revenue Streams
- "QNX has been going for years into industrial automation and control systems, like robotics, Growth Potential lines— into industries like oil and gas. You might have an offshore oil drilling rig where the drill is cutting through rock to get to the gas; if these systems weren't controlled by a real-time operating system, the result could be catastrophic. You could have a super-hot drill getting hotter and catching fire as it goes into the shale and then gas."
- "Industrial control and automation systems have been their traditional bread-and-butter application, where they got their start back in the late 1980s and early 1990s, and it's still being used there."
- "Competition in the industrial control and automation systems space would also be the same players as in healthcare, ones with real-time operating systems."

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>
> *Executive, Canadian Software Development & Consulting Firm*

5. Director of a software engineering firm in Washington state focused on mobile traffic information apps

QNX is well embedded in the auto, mobile and healthcare markets. It dominates auto market share and can expect continued growth in the space during the next five years. Wind River is a primary competitor in the healthcare sector, but QNX appears to have the edge in after-sale support. This source believes the sale of QNX is inevitable, either to a major U.S. auto manufacturer or a tech giant.

Growth Potential
- "QNX should be all right with its automotive and mobile solutions for at least another five years."
- "Auto makers are rabid about managing costs, but QNX is well established in the space and I think they'll respond aggressively to any competitive threat. Linux is pushing into automotive, but the major car makers are wary of it."
- "QNX delivers a wide range of embedded solutions for medical diagnostic equipment, and I hear they have a good reputation for after-sale support. Wind River is their biggest competitor on the medical side."

Pricing
- N/A

Market Share
- "QNX probably owns the automotive business and a large chunk of the mobile market. They can probably grow 5% annually for the next five years."
- "Their dedication to tech support for older products will help them on the medical side. There's not nearly so much churn in medical devices, but support and licensing probably offset that. Wind River also supports their older systems for healthcare customers. That's a core focus for Wind River right now. Sales to the healthcare industry could get cutthroat pretty soon."

Additional Revenue Streams
- "Cisco is a big QNX customer. I've heard they may try to buy QNX outright. I've also heard the same about Ford and GM."
- "Networking has endless capacity for sales growth."
- "Mobile is still a huge opportunity. There will probably be some expansion in automotive as well—the complexity and sheer number of monitoring systems going into new vehicles, navigational systems, audio and infotainment packages. QNX is deployed in all of these."
- "Defense contracts, although incredibly competitive and probably politically influenced, could also represent a growing revenue stream. Getting out from under BlackBerry might even facilitate that."

6. Software engineer at a northern Virginia IT company

QNX should be able to continue growing for the next five years but at a more modest pace given the growing competitive pressure in healthcare, government contracting and the automotive sector. QNX has enjoyed a virtual lock on the U.S. auto industry, but auto makers likely would be interested in comparable solutions that cost less. For now, QNX delivers the best real-time processing management solutions. Growth in the medical sector will not compare to the potential QNX has in the mobile market.

Growth Potential
- "QNX excels at mission-critical solutions. … Their strengths will continue to play well in automotive and medical applications in particular."
- "QNX has the best and most reliable real-time OS on the market. For medical equipment … QNX will continue to be a must for at least the next five years because of the critical nature of those devices. Pricing is going to be the main factor in automotive."

Pricing
- "QNX is the best, and their pricing reflects that. They also have terrific tech support, which is something you've got to consider. This technology is very

> I don't see anyone posing a serious threat to QNX on the healthcare business. With life-support equipment, diagnostic equipment, you just don't try to save money on a less-expensive solution that doesn't have the QNX track record. I don't think that's even going to be an issue.
>
> *Software Engineer*
> *Northern Virginia IT Company*

reliable, but if something goes wrong, there is a hidden cost in having to solve the issue yourself."

Market Share

- "I don't see anyone posing a serious threat to QNX on the healthcare business. With life-support equipment, diagnostic equipment, you just don't try to save money on a less-expensive solution that doesn't have the QNX track record. I don't think that's even going to be an issue."
- "Right now they've got the automotive market. I think it's theirs to lose, depending on what the competition brings to market and how QNX responds."
- "Linux appears to be ramping up very fast to grab more of the automotive business. I'm thinking this will put pricing pressure on QNX if car makers see the value. Linux has had some perception issues, being open source, and I think companies have been wary of that. They may still have a bit of a problem overcoming that."

Additional Revenue Streams

- "Mobile is where it's at for this type of OS management. They've got the tech; it's more a matter of making the right business play."
- "QNX probably should be acquired by another tech company that can pour some money into R&D and make a marketing push toward mobile."
- "Military and industrial contracts are another possible revenue stream. I don't think QNX has ever seriously explored that space."

7. Software engineer at a Washington, D.C., IT company

QNX has enjoyed premium pricing on its products as it has been the only reliable solution. Linux is trying, but has an uphill battle to enter the auto market. Unfavorable perceptions of Linux and its open-source platform could make some auto manufacturers reluctant to switch, but pricing will be key. QNX should continue to gain ground in healthcare technology, but this is not a huge profit center compared with the auto and mobile markets. Microsoft is a nonstarter.

Growth Potential

- "LynuxWorks [now Lynx Software Technologies] is making a play to grab the automotive business from QNX, but they've got an uphill battle. I think the only way Linux systems can win is on price, but they will also have to deliver tech support and demonstrate that their OS is just as efficient as the OS that QNX has in place."
- "If Linux gains traction in automotive, you might start to see some price wars. QNX is still the best at what it does, so I think the price differential would have to be very compelling for a major manufacturer to abandon them."
- "BlackBerry had better decide what they want to be and soon, or they're probably done. QNX is still very much a niche tech company and probably cannot help BlackBerry stay afloat. A sale might allow BlackBerry to refocus on their strengths. They still have a lot of strategic relationships and tremendous intellectual capital in-house. They might do well to concentrate on secure communications and data delivery for enterprise customers. That's what sold the corporate world on BlackBerry in the first place. Their touchscreen devices went nowhere. They're trying to resurrect handhelds with keyboards, but I think those days are gone."

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>
> *Software Engineer*
> *Washington, D.C., IT Company*

Pricing

- "You might see some downward adjustments in price if QNX starts feeling a pinch from their competitors. What distinguishes them is their uptime reliability and support."

Market Share

- "The automotive space for embedded software will be a battle fought between QNX and Linux. Microsoft is a nonstarter. For one thing, when they launch a new OS, they pretty much abandon support for the older version. That's one thing if you're a consumer buying a new laptop every couple of years, but I seriously doubt car makers or medical professionals are going to go with these incredibly sophisticated and expensive multitask systems that aren't backed up by support. Again, QNX wins."

Additional Revenue Streams

- "QNX can embed with transferrable mobile apps. That will be a big opportunity until people finally quench their thirst for things to do on their handheld."
- "QNX hasn't really looked into aeronautics. If I was the head of QNX, I'd talk to airplane manufacturers, Defense Department contractors."

8. Software consultant based in Canada, expert in Linux and embedded systems

The source cited increasingly little reason to use QNX over Linux as Linux can provide the same security and real-time features for less money. QNX's long-term stability is an issue when using it as an embedded technology. Linux is gaining market share in all areas.

Growth Potential
- "There's an overwhelming propensity to use a real-time kernel because that's the way it was always done by an older generation."
- "There are two types of real-time systems: hard real-time and soft real-time. Most systems need soft real-time. Linux has given you that out of the box for the last 10 years. And over the last two years, there's been fantastic collaborative work in the community to also give the kernel hard real-time, should you need it."
- "It's a whole system solution. You cannot simply check a box on a piece of software to turn it on and have it be real-time, soft or hard, and then the job is done. The only way to guarantee real-time is if you do a complete system-holistic solution. The hardware has to be selected to support the hard or soft real-time system. The design also has to be considered. It's a very complex question with a large spectrum of answers that depend on what you're trying to do."
- "Hard real-time, for example, is the sub-millisecond response needed in a jet fighter. There's no room for error. Or a control system controlling the engine for a jet airplane. But it's not just about hardware vs. software. It's a whole system issue."
- "Linux is not more easily hacked than anything else. Whoever is managing the system just has to be proactive about updates and patches."
- "Particularly in the medical sphere, the stability of QNX's existence puts it into question."
- "There are a number of free RTOS equivalents to QNX. The reasons for using proprietary RTS or QNX have gone down dramatically over the last 10 years to the point where someone really needs to come up with a good reason to use anything other than open source."
- "There's a huge misconception over what Linux is. Linux is highly configurable. If somebody needs to disable three-fourths of it to placate security fears, you can do it. You can turn off almost everything in the Linux kernel and turn it into a tiny kernel, the equivalent of the RTK you would have spent money on. But most engineers don't know that."
- "You'd be insane to use anything other than Linux as soon as you're into multicore."

Pricing
- "As a technical solution, QNX might be preferred over other operating systems, but you also have to look at the financials and the stability of the vendor."

Market Share
- "Without a doubt, Linux will increasing gain market share from QNX in all applications. The adoption rates of Linux are going through the roof."
- "Cisco is also increasingly moving towards Linux."

Additional Revenue Streams
- N/A

5) Software Security Experts
QNX's FDA certification will allow the BlackBerry subsidiary to grow in the healthcare area during the next five years, according to two sources who commented. One foresees growth of 4% to 5% because of QNX's superior support and non–open-source technology. One source sees QNX's pricing as under pressure, one believes its pricing power will hold, and a third source said QNX can demand a premium price because of its reputation. QNX dominates in market share, but Linux is a competitor,

particularly in the IoT field. The IoT, industrial and military fields are potential areas of growth for QNX. One source said Cisco is a likely buyer of QNX.

KEY SILO FINDINGS

Growth Potential
- 2 of 3 QNX's FDA certification gives it a competitive advantage in the healthcare field.
- 1 said QNX can grow 4% to 5% over next 5 years due to its superior support and non-open source technology.
- 1 said Cisco is a likely buyer of QNX.

Pricing
- 1 said pricing is under pressure from free and open-source software.
- 1 said QNX can and does demand a premium price, especially in the medical field, because people trust the company.
- 1 said QNX should be able to hold pricing power.

Market Share
- QNX has market share dominance.
- Linux is a competitor, but only 1 source expects Linux to succeed in taking share and only in the IoT market.

Additional Revenue Streams
- IoT, industrial and military applications are areas of growth for QNX.

1. Software developer and architect based in Canada, consulting in real-time embedded systems and QNX

QNX has a strong presence in medical devices because of certification, making it a go-to off the shelf solution. QNX recently gained share in the automotive sector but faces competition from the likes of Android, because security is not an important issue in infotainment. In IoT, QNX faces strong pressure from Linux, which now can perform similarly with real-time features and is free.

Growth Potential
- "In the medical device projects I've been involved in, QNX was selected over Linux as they have FDA certification as a medical device software. That's one of the main advantages for customers when choosing QNX over Linux. It's because it's certified, off-the shelf and you're done."
- "The companies I've done projects for are happy [with QNX] in terms of stability and the kind of support they're getting."
- "After BlackBerry acquired QNX, they really did beef up. ... Based on what people have told me, that there are two streams of QNX: one being used for BlackBerry devices and one being commercially released. I don't think people can buy the one that's in the BlackBerry."
- "The BlackBerry OS has different constraints because it's embedded and fits well with QNX, but if you look at the history, around the time Harman bought them QNX had gone open-source. They still charged a license fee but allowed people to look at the source code. Once BlackBerry acquired them, all that open source disappeared and they shut the doors. Now, certainly none of the critical things are available in open source, like the operating system. They've greatly reduced their open-source footprint."
- "The whole automotive sector is one of their main focuses. It goes back historically to when they were working with Harman Kardon Becker. That's how they got into high-end cars. They didn't want to give it up when BlackBerry bought them, and BlackBerry agreed to continue it."
- "Anybody who makes applications for smartphones or for the Android OS could be a competitor. And there's no compelling reason why that part of things would have to be safety-certified."
- "QNX is entirely proprietary. You can buy a source code license from QNX, put it on high-end routers, etc. ... Cisco is certainly not going to release any source codes. That's a major pivot point."

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>
> *Software Developer & Architect*
> *Canada*

- "When QNX got acquired by BlackBerry, people got sucked up into BlackBerry. The current rumor is that some of those people are now being brought back into QNX. Is the aim of Mr. Chen to sever QNX, or is just basically to bring home his troops?"
- "QNX infected BlackBerry with its development style. QNX tends to be run as the Wild West at times, and that's been taken on at BlackBerry, wild ideas and all."
- "One of the lessons is to note what happened when QNX got acquired by Harman: They suddenly became competitors to certain products. So are they perceived as being locked out of certain markets because BlackBerry is a competitor? And if they get spun out, will that help? These are all interesting considerations."

Pricing
- "Pricing is a never-ending battle for [QNX]. Historically, they were ridiculously expensive. Lately, I don't know what the pricing model is like, but I believe they have been under pressure from all the free and open-source stuff. The problem is as the hardware gets faster, the demands for a real-time operating system get lower and lower. The whole goal of QNX is trying to solve is to respond to an event in a certain number of microseconds. When the hardware was really slow, it used to be all about the architecture. You had to have a very lean operating system to respond in 10 microseconds. Nowadays, with fancy chips that operate at billions of instructions per second, it's nothing for Linux, with its bloat, to respond in 10 microseconds. That's one of the performance pressures on QNX."

Market Share
- "They're gaining market share in the automotive sector. They displaced Windows at Ford. That was a major coup."
- "In the Internet of Things, there's going to be a problem with competition from Linux. Linux has a fair bit of penetration in that."
- "The smallest IoT devices are door locks, cameras, security sensors, motion sensors, refrigerators, washing machines—whatever you want to connect to the Internet. These guys aren't going to pay large licensing fees to add something consumers may or may not want, so Linux is going to be the big thing there."
- "Wind River's product is VxWorks, their own proprietary real-time operating system. But they got bought by Intel and have turned mostly into a Linux shop. They do a lot of support now."
- "Linux also has a lot of mind share with developers. There are a lot of Linux people out there with Android."

Additional Revenue Streams
- "[QNX's] main base was industrial automation because they were easy to use and very fast. When they went into the automotive sector, it alienated some of their process control industrialization type of customers."
- "If you look at the development systems that are available—let's say if I had a brilliant idea for an IoT device, for $25 I can buy a development board, put Linux on it for free, and I'm off to the races. And the cost to entry is $25 plus the Linux download. For QNX, they have fairly expensive development fees, and though they do have programs for students or entrepreneurs, if you're a large company, you're going to be paying tens of thousands of dollars in development fees."

2. Computer and software consultant and academic based in Canada, with extensive experience in QNX

QNX's OS has built-in security, a reputation of reliability and the approval of the FDA. QNX is BlackBerry's only hope to survive as long as it can continue to bring in the right people to innovate and create software that customers want to buy.

Growth Potential
- "QNX's operating system has tremendous security built in because of its design. It makes full use of the underlying Intel hardware and builds on the Unix philosophy that small is better."
- "They base security on a much smaller footprint than an entire security system [to prevent failure because of complexity]. The little core works perfectly and supports all kinds of programs running on top. You can figure out how those programs might fail, but they can't compromise the whole system, they can only compromise themselves. Operating systems like QNX do that very well. They create little silos and protect all the programs from each other. Sometimes you want them to break through the walls and talk to each other, but they've figured out ways that can happen."
- "They have a very effective understanding of how hardware works, proper use of interrupt structure, context switching and things like that. They understand the hardware they're building on and build an operating system that works well on top of that. That's been their forte for years now."

- "QNX is big in the automotive world with a well-established reputation there. Certainly it's big in BlackBerry, but it also appears in a number of other companies' products. Cisco uses QNX in some of its routers and switches, and also a number of other products QNX has been built into. A lot of those markets have been nailed down because once you've made a decision to use a particular operating system for your embedded OS, you've tied your own hands and you're stuck with them."
- "Automotive is very strong for QNX. All the top-end cars are currently using the product."
- "Once you have one of the big three [auto makers] like Ford going over to QNX, you'll have the others looking very carefully at it because of the competitive advantage."
- "QNX software has had a reputation over the years for being rock-solid. QNX 4 went for about seven or eight years without any patching required because no bugs were discovered, and it worked solidly. And they only started patching it after that because of the new devices and technology that they needed to incorporate at the core level. That sort of experience is what makes the FDA and the aviation authorities in the U.S. interested in it as an operating system. Those organizations don't care about novelty; what they're looking for is stability."

Pricing

- "QNX has always tended to price their product to let you know it's better than everybody else's. They've also priced their product to eliminate some of the small customers. If they eliminated all the technical support they needed for all their small customers, they'd probably make more money."
- "They have FDA approval for their operating system, so anybody who'll build a medical device looks at them very closely. When you're building medical devices, money is no object. If people died because you're scrimping and saving a few dollars, that would be much worse. You buy the very best, and you let everybody know you're buying the very best. And if the very best works very well, everybody is happy."

Market Share

- "In the real-time embedded operating system world, the competition is Linux, in a variety of flavors. Its main selling point is that it's free or at nominal cost, depending on the package of support you're getting. And there's Wind River's VxWorks. There are a dozen varieties of commercial products that people will build embedded systems on top of. And there are a lot of build-your-own, not necessarily trying to be commercially competitive but trying to produce a product for which they need an OS and they decide to build their own instead of buying one."

Additional Revenue Streams

- "QNX is an OS that's meant to work in small footprint environments. It can be built and provide Internet access in a very tiny amount of memory. That's one of its advantages. The one thing it doesn't have a reputation for yet is implementation on some of the microcontroller devices."
- "In IoT, where the products need to talk to their peers … all those things will end up with controller devices on them that need to be able to talk on the Internet, and everyone of those will be a candidate for some kind of an embedded operating system. There are versions of Linux that might fit the bill, and I'm sure there's a version of QNX that also does. I just haven't seen a commercial product touted yet."

> You can figure out how those programs might fail, but they can't compromise the whole system, they can only compromise themselves. Operating systems like QNX do that very well. They create little silos and protect all the programs from each other. Sometimes you want them to break through the walls and talk to each other, but they've figured out ways that can happen.
>
> *Computer & Software Consultant*
> *Canada*

3. Senior technology architect at an international IT company

QNX remains the industry leader for secure, reliable embedded software solutions for the industries it serves. On its reputation, QNX can continue to operate with modest growth of 4% to 5% for the next five years. Competitors may force some initial price adjustments, but are considered insecure based on the open-source nature of their applications. Linux will have to demonstrate it has closed potential security breaches before it can woo the automotive industry. BlackBerry is perceived throughout the tech industry as a struggling entity with no clear leadership vision. Divesting QNX might help both companies, as BlackBerry then could focus on such assets as secure data delivery for enterprise business.

Growth Potential

- "QNX probably controls most of the automotive business for its products. Linux is trying to breach that wall, with mixed results. Linux products are less expensive than QNX, but the industry perception of open source still dogs Linux. Also, QNX backs up sales with support, and that's part of their value proposition."
- "QNX can probably grow 4% to 5% a year for the next five years unless some game-changing solution appears to challenge them with their automotive partnerships. Their growth prospects are probably brighter on the medical side. Doctors and lab techs aren't going to put in a request for diagnostic devices unless the capabilities and specs satisfy them."
- "If [BlackBerry] can hang on to QNX and leverage that business to improve some of their software offerings—like encrypted data transmission for sensitive and proprietary information—then they might move forward. They're sitting on a lot of cash, but they're spending a lot too. If money becomes the issue, then I would look for QNX to find a new home. Cisco wants them. I've heard Apple is also interested, but I see QNX moving in with more of a back-end company like Cisco. I don't know what Apple could do with them."

Pricing

- "QNX should be able to hold their pricing unless some amazing alternative becomes available at an equal or lower cost."

Market Share

- "QNX probably owns most of the automotive market. Linux has an image problem, but that is slowly fading away. If QNX keeps doing what it does so well, I doubt they will lose business to Linux. Their healthcare business is secure. Precision and dependability are vital in medical machines. QNX delivers on that front."
- "How many devices need this very specialized type of multitasking OS? I don't see QNX making big gains in the Internet of Things beyond highly specialized apps that serve a limited number of people. Your oncologist might find it handy to review your test results at the hospital on his smartphone, but there is probably a limited need for this type of multitasking power. At the consumer level, maybe transferrable mobile apps."

Additional Revenue Streams

- "Expanding into interconnectivity among devices seems a logical move, but again I think there may be limited demand for that."
- "Because the automotive industry has embraced them, I would imagine QNX would look along the lines of industrial applications and defense suppliers that need advanced processing abilities."

> Linux products are less expensive than QNX, but the industry perception of open source still dogs Linux. Also, QNX backs up sales with support, and that's part of their value proposition.
>
> *Senior Technology Architect*
> *International IT Company*

Secondary Sources

The following five secondary sources highlighted QNX's wide client base as well as competitors' focus on security upgrades and IoT.

QNX

These two sources discussed QNX's new partnership with global mapping company Zenrin as well as QNX's diverse set of clients.

May 14 QNX.com article

QNX has entered into a partnership to integrate its software to Zenrin's navigation systems in Asia.

- "QNX Software Systems, a subsidiary of BlackBerry® Limited and a global leader in software platforms for in-car electronics, today announced that ZENRIN DataCom Co., Ltd., a leading provider of premium mapping services and products, will integrate its Its-mo NAVI [Drive] 2013 application with the QNX CAR™ Platform for Infotainment."
- "Its-mo NAVI [Drive] 2013 is a high-performance navigation application for smartphones that provides users with access to maps, local fuel prices, and available parking spots. ZENRIN DataCom and QNX Software Systems will demonstrate integration of Its-mo NAVI [Drive] and the QNX CAR Platform at Smartphone Japan, May 14-16, 2014, ZDC Booth, East Hall 34-5, Tokyo Big Sight, Japan."

- "According to ZENRIN DataCom, 'The automotive market in Japan and the rest of Asia is a vibrant and compelling environment for app developers but market volume is significantly lower than that for smartphones. A cross-platform concept is key as it enables apps to run on both smartphones and vehicle head units with minimal changes. The QNX CAR Platform, with its rich support for mobile application environments, is a very attractive feature for app developers in the mobile world.'"

March 11 ZDNet article

QNX is thriving as it diversifies its core-business of in-auto entertainment systems to other areas. QNX has 40 customers in the automotive sector as well as in Apple, NVIDIA, Pandora, Texas Instruments and the Weather Network.

- "Apple's CarPlay has to ride on top of BlackBerry's QNX platform for in-auto entertainment systems. Ford was reportedly pondering a swap from Microsoft to QNX to for its Sync platform. And it's highly likely that the front end of Google's Android in-vehicle efforts are also going to have a QNX play."
- "So when BlackBerry CEO John Chen calls QNX one of the crown jewels of the company he's not kidding."
- "Apple and BlackBerry have had a long-standing partnership on QNX as a way to connect iOS to in-car systems. In many respects, QNX serves as a middleware layer for in-car infotainment. News surfaced last week that Apple's CarPlay, which launched with iOS 7.1 on Monday, was based on QNX."
- "Auto manufacturers and now smartphone players will apparently control the interface and user experience. That fact may mean QNX's flexibility is even more important."

Partner	Integration
Apple	iPhone/iPod multimedia integration
Best Parking	location-based parking search
Digia	Qt commercialization
Elektrobit	embedded navigation
Freescale	silicon vendor
Hear Planet	internet audio streaming service
JQuery	JavaScript framework
Nuance	speech recognition
NVIDIA	silicon vendor
OpenSynergy/Cybercom	integrated Bluetooth stack and profiles
PacketVideo	DLNA stack for Android mobile device integration
Pandora	streaming internet radio
Parkopedia	location-based parking search
RealVNC	MirrorLink connectivity
RedBend	FOTA software updates
Sencha	JavaScript framework
Slacker	streaming internet radio
Soundtracker	internet music streaming service
Texas Instruments	silicon vendor
Wcities Eventseekr	location-based event service
Weather Network	integrated weather service

- "QNX has more than 40 automakers—Acura, Audi, BMW, Chrysler, Ford, GM, Honda, Hyundai, Jaguar, Mercedes, Land Rover Range Rover, Porsche, Toyota, Volkswagen—in the fold."
- "Rest assured QNX will stick around and even thrive. Why? QNX is the Switzerland that the auto industry needs to preserve margins, deliver value added services, customize the experience and keep smartphone players from dominating."
- "If that Switzerland role can be cultivated in other verticals such as appliances (where Android wants to be everywhere) and medical devices, QNX may indeed by BlackBerry's crown jewel."

Competition

These three articles centered on the Linux Foundation gaining help to secure its open-source structure, Green Hills entering into a new agreement to create auto applications, and Wind Rivers offering an upgrade to Linux systems that make them more secure.

April 24 eWeek article

The Linux Foundation is heading the Core Infrastructure Initiative to prevent another Heartbleed, with help from such participants as VMware, Rackspace, NetApp, Microsoft, Intel, IBM, Google, Fujitsu, Facebook, Dell, Amazon and Cisco.

- "The Linux Foundation has assembled many of the world's leading IT vendors together in a new effort to fund core infrastructure projects and help prevent another Heartbleed from ever happening again."
- "Participants in the Core Infrastructure Initiative, led by the Linux Foundation, include VMware, Rackspace, NetApp, Microsoft, Intel, IBM, Google, Fujitsu, Facebook, Dell, Amazon and Cisco. Those industry heavyweights have committed to contributing funds to help developers who are building core infrastructure projects like OpenSSL."
- "'Sometimes it takes a crisis to do the right thing,' Jim Zemlin, executive director of the Linux Foundation, told *eWEEK*. 'There is nothing broken in the open-source model, but we wanted to see what lessons could be learned from Heartbleed and how we could make something good come out of it.'"
- "The Heartbleed security flaw, disclosed April 7, is a vulnerability in the open-source OpenSSL cryptographic library that is widely used on servers and embedded devices around the world. In light of the flaw's impact, some have questioned the cost of the open-source model itself. The OpenSSL community itself is not well-funded, and the OpenSSL Software Foundation has publicly requested donations."
- "Zemlin explained that the Core Infrastructure Initiative at the Linux Foundation asked for a $100,000-a-year, three-year commitment from each participating company. In total, more than $3 million has been raised so far."
- "'Every company I called, when I told them about what we were doing, they all got it and just wanted to help,' Zemlin said."
- "Each contributing vendor in the Core Infrastructure Initiative will have a seat on the steering committee for the group, which will also have an advisory board. The basic idea is to have an organizational structure to help identify the projects and the developers that will receive funding. The foundation has been funding core Linux developers for years, most notably Linux creator Linus Torvalds, in a similar kind of model for Linux."

May 19 MarketWatch article

Green Hills has entered into a collaboration with Neusoft and Freescale Semiconductor to increase the speed and simplify the creation of car vision applications.

- "Freescale Semiconductor is collaborating with Neusoft Corporation and Green Hills Software to establish a comprehensive Advanced Driver Assistance Systems (ADAS) ecosystem designed to dramatically speed and simplify the creation of next-generation automotive vision applications."
- "As ADAS vision systems grow to encompass a greater portion of vehicle braking and steering systems, developers and systems designers need turnkey solutions that address stringent protocols for automotive safety, and are compliant with the ISO 26262 functional safety standard. This purpose-built ADAS ecosystem is engineered to meet these challenges by streamlining the time-consuming process of developing and porting complex algorithms to target hardware."
- "The collaboratively developed solution integrates CogniVue Corporation's APEX Image Cognition Processing (ICP) IP available from Freescale with advanced, silicon-aware software from Neusoft's ADAS vision applications, and the safety certified INTEGRITY® operating system and MULTI® tool chain from functional safety expert Green Hills

Software. The result is a comprehensive off-the-shelf ADAS vision solution built on an ISO 26262 ASIL assessed software foundation. Specific applications include pedestrian detection, traffic sign recognition, collision avoidance and other advanced ADAS capabilities."

April 29 MFRTech article

Wind River Systems has upgraded its systems on top of Linux to become more secure.

- "Wind River, a world leader in delivering software for intelligent connected systems, has announced Security Profile for Wind River Linux, a software offering certifiable to the Common Criteria General Purpose Operating System (GPOS) Protection Profile up to Evaluation Assurance Level 4 (EAL 4). With increasing connectivity among devices, using a well-established, standards-based approach such as Common Criteria during development can help address security concerns around the Internet of Things (IoT). Additionally, Wind River has released the latest version of Carrier Grade Profile for Wind River Linux, a turnkey platform for customers to meet Carrier Grade Linux (CGL) requirements."
- "Our new Security Profile for Wind River Linux provides a secure and reliable industry standard computing platform that allows customers to shorten development lifecycles and get to market faster with the security, performance, and user experience required for today's increasingly intelligent and connected devices across a range of industries."
- "Security Profile is a high value add-on software profile for Wind River Linux that delivers new security capabilities to help developers combat against future threats arising from the growth of IoT. Key features including a hardened kernel, secure boot, a security-focused user space, and the Yocto Project Compatible Wind River Linux base seamlessly integrate with validation tools, documentation, and hardware support."
- "With the Internet of Things, the needs around device connectivity and security are growing more complex, yet companies are under pressure to keep to tighter development schedules and budgets, said Dinyar Dastoor, vice president of product management at Wind River. Our new Security Profile for Wind River Linux provides a secure and reliable industry standard computing platform that allows customers to shorten development lifecycles and get to market faster with the security, performance, and user experience required for today's increasingly intelligent and connected devices across a range of industries."
- "'With rising movements like the Internet of Things, developers are facing new complexities as they work on projects that demand higher levels of security, intelligence, and performance,' said Mike Woster, chief operating officer at The Linux Foundation. 'Wind River has long been an open source champion and continues to pave the way for developers to use the latest Linux innovations and overcome new hurdles.'"

Additional research by Marissa Yaremich, Steve Evans and Eva Cahen