WhiteBerry Technical
Due Diligence Report
by
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for
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About This Paper

This document is an independent due diligence evaluation report of Neda's Operation WhiteBerry initiative, commissioned by Greg Amadon and conducted by Martin Haeberli in January 2003.

On completion of the report Mr. Amadon provided us with a paper copy, and granted us permission to provide the report to other persons at our discretion.

We scanned the document, and on various occasions e-mailed the scanned file to interested persons. However the large size of the scanned file proved inconvenient for electronic transmission.

To facilitate electronic transmission, we used OCR (Optical Character Recognition) software to process the scanned file into a text file. We then formatted the file to duplicate the original formatting.

The result is this document. To the best of our knowledge it is a faithful duplication of the original. The scanned version, or a photocopy of the original, are available on request.

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1 Summary & Conclusions

I performed a review of Operation Whiteberry, contemplating the technology, the business opportunity, and the people behind the effort so far.

A great deal of broad and deep intellectual work has clearly gone into developing the technology and the business vision. Mohsen and his colleagues are very passionate about the importance of their efforts and about the size of the opportunity.

Essentially, the Whiteberry technology dramatically streamlines the efficiency and reliability of communication among internet-connected devices. This is most obviously important in the envisioned wireless applications, where the large reduction in packets exchanged and bytes sent for message exchange can result in a much more reliable, cost effective, and power-efficient experience for the end user. Wireless (data) carriers could benefit as well, at least in theory, by the intended efficiency improvements; they would allow a much larger number of users to be effectively served with the same infrastructure.

The immediate potential is to offer an open-source/licensed architecture to functionally compete with Blackberry, but the technology has other possible applications as well. For example, it could be applied in an SMS-like context to dramatically improve the reliability and timeliness of SMS/MMS-style message delivery. I believe that it would get amazing market traction if married to an open or, even better, to a range of proprietary IM (instant messaging) platforms. Finally, I believe that keeping an open mind to other ways the technology can be used can dramatically increase the size of the business opportunity.

As an example, in conjunction with both WiFi and CDPD, I believe that there is a large opportunity in hospitals that are beginning to use wireless handhelds to address new HIPPAA requirements. Here, the technology can offer strong reliability, power, and efficiency gains. As another example, the same technology may be quite valuable as an enabling technology for IP-based wireless sensor networks.

From a business perspective, the overall scheme proposed looks and is quite complicated. The fundamental idea is to initiate the first pure ”protocol play” business model, with the potential for interlocking layers of value and revenue streams to be developed.

The argument for success asserts that this complexity and diversity allows a good deal of business opportunity to survive adapting to competitors in the marketplace as the marketplace grows.

The argument against the business success of these efforts includes:

- the complexity of the sheaf of opportunities
- the novelty of a ”protocol play” strategy
- the large risk that, despite the benefits, this technology will not see its potential for widespread adoption realized.
- the possibility that the passionate focus of the current Whiteberry team on its worldview can preclude the ability to flexibly and rapidly learn enough from marketplace feedback to survive.

There are four obvious paths for an investor to take at this juncture:

a) invest nothing

b) make a seed investment that takes the efforts quickly to a first set of market trials, and learn from that market feedback to inform the decision on next steps. Then, if appropriate, make a follow-on investment

c) make a larger investment that covers the seed stage and the low end of the range for a follow-on

d) commit to the ”full boat” – a seed investment plus a follow-on investment at the high end of the range.

At this point, I would recommend that you seriously consider choice b), but only in the context of realizing that this is the lowest risk way to measure the market potential of this approach. It would be best to do this while working with a well-defined set of potential investors for the later stages – unless you want to carry the whole investment yourself at later stages, you will reduce the risk that your seed investment is wasted by gaining this understanding.

The reason for even contemplating an investment is the possibility that, if this is well-managed, returns could be quite good. They better be, because the risks remain high as well:

- in the current environment, the market may in fact not be ready for this approach
- the ability to monetize adoption in a major way is still to be proven

Some ways to mitigate these risks as an investor include:

- approaching companies such as Handspring and Palm relatively quickly to explore their potential interest in this technology vis-à-vis Blackberry. As it happens, I may be able to help you with contacts at both firms.
- validating the potential through exploratory discussions with makers of WinCE handhelds, CDPD modems, and WiFi cards for handhelds, as well as with potential carrier partners.
- syndicating the investment among other investors, including seed-stage VCs

In essence, performing some of the business development effort up front can help further validate the immediate potential.

2 Process

To conduct this review, I began with your email introduction to Mohsen, and spoke with him on the phone. He sent me a rather massive reading assignment – I have read a number of the relevant documents thoroughly, and have skimmed many of the rest.

I then arranged for an on-site meeting in Bellevue with Mohsen, which took place on January 10 During this daylong visit, Mohsen and I conducted an extensive set of discussions and review, including looking at some of the available presentations. We also had lunch with Andrew Hammoude, and briefly met Pinneke Tjandana.

On my return, I continued my document review, guided by the onsite discussion, and also conducted a modicum of research into related companies, such as Research in Motion, Novatel, and Sierra Wireless.

3 Concept

As discussed above, the Whiteberry concept is intended to be the fulcrum for a pure ”protocol play” – a business strategy that intends to harvest value through the broad and rapid adoption of a set of protocols. The protocols themselves have been designed with a certain elegant simplicity – their genius is that they can be used to support a broad range of communications applications, especially in wireless networks, while dramatically reducing the bandwidth, latency, and power consumption needed, and while increasing reliability.

The initial adoption momentum in the Whiteberry effort is intended to come from offering an open, flexible, inexpensive, extensible alternative to RIMM's current Blackberry solution set.

As context, note that RIMM recognized almost US$ 90 million in service revenue alone in FY 2002, more than double their FY 2001 number. They seem to be on track for at least $110 million in service revenue for FY 2003, in the face of a declining fee structure and a still growing subscriber base.

An argument can be made that a Whiteberry solution in the marketplace could easily exploit the potential user demand/price elasticity, and rapidly increase adoption while putting Blackberry's growth at risk.

Given RIMM's strong cash position (˜US$ 395 million at Q3 2003 end), a cynic could even argue that RIMM would have a strong incentive to acquire and eliminate Whiteberry should it get good enough traction in the marketplace.

In any event, the ”protocol play concept would allow the Whiteberry effort to leverage the following opportunities:

- device software: deployment and eventual revenue licensing of device software to device and modem manufacturers as well as systems integrators and service providers
- server software: deployment and eventual revenue licensing of server software to enterprises, systems integrators, and service providers. (RIMM's service revenue numbers above do not include server software licenses.)

- intranet/enterprise: deployment and eventual revenue licensing of a complete software solution to enterprises for use on intranets
- ISPs: deployment and eventual revenue licensing of a complete solution to ISPs and systems integrators
- service itself: deployment of a set of free and eventually revenue services through, for example, my.byname.net. Also the potential exists to operate the service for revenue on behalf of other parties in the extended Whiteberry community, such as on behalf of an ISP.
- Other applications for the protocols (i.e., instant messaging, HIPPAA, etc.)
- Security extensions to the LEAP protocol family could by themselves be quite valuable as LEAP is adopted.

One approach, which could be successful at getting early traction, I discussed in depth with Mohsen and Andrew:

- Complete the conversion of the current WinCE software to the most recent WinCE platform
- (Preferably also...) Complete the implementation of a J2ME (Java 2 Micro Edition) version for use with handhelds and cell phones that support J2ME
- Ensure that the initial service offering on my.byname.net is ready and has been validated at least to a modest scale (5,000-100,000 accounts, 3,000- 10,000 active users)
- Obtain and document current information on available handhelds, modems, and carriers
- Complete a current, brief document attractive to the ”Slashdot set” explaining how to roll your own Blackberry with the Whiteberry approach
- Post this information when all is ready, with a modest PR push, to Slashdot and a few other places (O'Reilly network comes to mind, for example)
- Observe, measure, and encourage adoption by this ”hacker-style” extended community
- For extra credit, adoption would likely be accelerated a good deal more by the availability of an IM solution (instant messaging) for Operation Whiteberry, especially to the extent it can be transparently integrated into leading solutions like AOL IM, Yahoo IM, MSN IM. Integration with Jabber (an open source IM platform) would be useful, but likely not sufficient to drive installation and usage strongly.

Completion of these steps, and measurement of adoption at this stage, could easily serve as a validation platform for pursuing solid discussions with companies like Handspring, Palm, and perhaps even IBM.

After this initial phase, one could potentially be in a position to:

- Invite the open source community to enhance and extend the technology, as well as to build upon it
- Begin working with makers of handhelds, modems, and with wireless data carriers, to target end users and encourage further adoption. At this stage, one can also imaging beginning to craft revenue sharing or other arrangements with these partners
- Begin exploring revenue models for the service offerings

I believe that the Whiteberry team's approach, while unconventional, has promise. In order to have a chance of realizing this promise, the effort needs to be proactively managed.

4 Team

I met with Mohsen, Andrew, and Pinneke. I spent the bulk of my time with Mohsen, and a bit of time with Andrew. I did not get a chance to spend any 1-1 time with Pinneke.

Mohsen is clearly very intelligent, and passionate about these efforts. He is also a prolific writer. My impression is that he has integrity, and has an open and honest approach to business.

Andrew also seems to be a strong leader, based on his resume and my interaction with him.

Mohsen envisions hiring a modest number of people when he is able to obtain seed funding. Based on a quick review of their resumes, Pean Lim and Mark Mc Wiggins are strong technologists up to the task of finalizing and extending the current code base.

5 Barriers to entry

A competitor aiming to supplant or co-opt the Whiteberry effort will face a number of challenges. While the intellectual property here is, by design, out in the open, the code base reflects a good deal of work and experience by Mohsen and his team. This hypothetical competitor may get some benefit from have the source code available to them, but cleanly re-implementing this may not make fiscal sense – it may be much more attractive merely to pay the license fee for commercial use.

This competitor will likely also suffer from a lack of the overall vision that Operation Whiteberry holds – developing and acting on a vision of this scope takes time and energy.

6 Strength of Technology

The core technology is mature, and has been validated over the years. It has been licensed, in earlier form, to a number of wireless modem makers.

The technology also has strong functional advantages over available alternatives. And there is the opportunity to use the core technology in other fields of use much less obvious than Whiteberry.

The biggest immediate weaknesses in the technology as it stands today are:

- The WinCE version needs to be ported and validated on current WinCE platforms
- A J2ME version should be made available ASAP
- The back-end (my.byname.net) needs to be polished up and validated to modest scale, and eventually to large scale.
- There is not yet a current, easy to read and use ”do-it-yourself” integration guide for the intelligent hacker. Completing this is more a matter of some integration research than of a good deal of new code.

7 Implementation Risks

The biggest implementation risks are:

- Resolution of the weaknesses mentioned above
- Determining the real size of the opportunity
- Getting a roll-out started
- Figuring out how to monetize the opportunity as it grows

8 Quality

A complete review of software quality was beyond my scope. However, a quick review of the source code, and the maturity of the code, suggest no immediate reason for concern about the quality of the protocol implementation proper.

Achieving acceptable quality, and improving the quality to gain broader acceptance, will be very important for facilitating adoption of this solution. The biggest unknowns in this regard relate to the newest aspects of the development effort – the new WinCE port, J2ME, and finally the back-end services.

9 Market Competition

Visible competition in this market arises especially from RIMM. Palm, Handspring, Danger, and Good all have distantly competitive offerings. Palm and Handspring at least, and perhaps Danger and Good, could likely benefit from using Whiteberry/LEAP protocols as a complement to their current technical approaches.

RIMM suffers, however, from having an important and growing revenue stream to protect. It's difficult to imagine them letting this go in a way that endangers Whiteberry.

A quick back-of-the envelope calculation shows that, RIMM has seen surprisingly strong subscriber growth over the past few years, even in the face of a weak economy and pallid growth in cellphone subscribers, which might be viewed as an analog for RIMM's demand. The RIMM base grew ˜ 93% to ˜ 320,000 users in FY 2002 (ending April 2, 2002), and has grown since at a still-respectable 11-15% per quarter. In fact, the growth rate if anything seems to be accelerating through the year.

This has been achieved probably through a relatively steep drop in the average sales price of handhelds, and a somewhat slower decline in service prices. RIMM seems to be grossing upwards of $20/month/subscriber in service fees at the moment. Their hardware revenue has plummeted from an average of ˜$1170/unit in FY 2002 to ˜$458/unit in Q3 FY 2003.

For Whiteberry, these numbers can be encouraging, as they suggest that demand is increased by falling price, and the argument can be made that at least a fraction of RIMMs 100,000 incremental customers per year could readily switch over, in addition to the organic growth from customers needing Whiteberry messaging who would never purchase from RIMM, and who may already own all the hardware needed.

By the way, RIMM seems to be burning a surprising amount of cash in the process of growing its business – the income statements don't seem to tell the whole story, and the balance sheet is bleeding cash much faster than the cumulative losses would suggest.

Other theoretical competitors might include carriers and the CDPD modem makers, like Sierra Wireless. In my view, these candidates are very unlikely to compete with the Whiteberry approach, and are much more likely to be partners.

10 IP Protection

Whiteberry's IP approach is to:

- Make their source code openly available
- Charge only for revenue use, not for free use
- Ensure as much as possible that their technology does not infringe on known and potentially relevant patents. This is achieved where possible by using technical approaches that leverage well-known, widely-published prior art.

There remains the danger that others will take this technology and file and perhaps gain patents on elements of it. As far as I know, this cannot be prevented, but one would hope that a reasonable court and jury would recognize this tomfoolery should a related matter come to trial, and would act appropriately.

Also, Whiteberry's core technology leverages straightforward (and perhaps therefore obvious) extensions to the widely-used TCP/IP connection state machine. One would hope that this would strengthen the case for prior art were patent litigation to take place.

11 Value to Users / Customers

Operation Whiteberry offers the potential for open, cheap, extensible wireless messaging to a broad range of users ? individuals, small businesses, enterprises, colleges, universities, schools.

This can potentially be very valuable. I believe that some reasons RIMM is growing relatively slowly is that their solution works against only Exchange and Domino, and is very expensive, both on an up-front as well as an ongoing basis.

If deployment of Whiteberry reaches is promise, thousands and eventually hundreds of thousands of users can quickly and cheaply get and use wireless messaging without paying the "Blackberry tax."

In addition, straightforward extensions to the applications in the Whiteberry environment can easily add much-valued features such as instant messaging.

With skill and luck, such a movement can create a vital ecosystem full of opportunities for the Whiteberry team and a host of other players. This is the essence of the "protocol play" idea.

12 Strengths

Whiteberry has in its hands an excellent core technology, a good opportunity, an excellent and impassioned core team, and a track record of getting a lot done on a shoestring, if needed.

13 Weaknesses

The team's passion and focus may be blinding it to concrete pragmatic steps that can help it move towards success, as well as to the large risks, which will need to be managed in order to succeed.

14 Opportunities

There is the opportunity to extend the value of the Whiteberry platform to end users by adding, for example, Instant Messaging.

There is also the opportunity to look hard for other contexts where the core technology can be applied in order to harvest direct revenue – the HIPPAA example I cite above is one of those. I believe that the broader team, especially the business development effort, needs to look hard, make a long list, rank it, and begin to pursue some of the top-ranked choices.

15 Threats

I see no competitive threat as such to Whiteberry other than the risks identified above – the largest is that the market might not want/need this solution at this time.

16 Other Observations

*For this effort to be successful, a focused, revised business plan and a business development strategy need to be completed very quickly, in conjunction with tying up the technology loose end (e.g., current WinCE port, etc.) mentioned above.

*I would advise that any investor focus carefully on initial use of proceeds – Mohsen's clear and above-board intent is to hire the development staff needed to complete the final technology tasks, and also extend his business development efforts modestly as needed.

However, I have identified two concerns:

- Mohsen anticipates ramping to 10 people with a burn rate of $200K-$250K per month over a few months. I was surprised at this burn rate – even here in the expensive silicon valley we have become accustomed to numbers more like $ 10K per person per month, fully burdened. And this business should not be capital-intensive at this stage.
- Mohsen expressed the understandable intention to use some of the investment proceeds to pay some immediate lump-sum compensation to his staff, including himself, to offset for the fallow period where they have been working without pay. While this may be appropriate, it is an issue for you as an investor to clarify and get comfortable with. It also may risk exposing investors, especially board members, to the risk of future employee litigation to collect deferred compensation.

*Operations – the current server/network cloud is impressive for the frugality with which it has been built and operated and for its utility under that constraint. Still, for this project to go forward, a modest amount of planning and investment would be appropriate to ensure that connectivity and processing resources are appropriate to the tasks at hand.

*My.byname.net is still not running well enough for me to explore its potential. I raised this issue to Mohsen early last week, but it has not yet been addressed. It seems reasonable to assume that, with funding, this kind of problem is quickly cured, and eliminated from future consideration.

*Documentation and naming – In the process of conducting this review, I had occasion to download many documents from the various relevant web sites under Neda's control. Many of the .pdf files, for example, all have the same generic name, "main". It is a trivial point, but I would suggest a minor naming cleanup is in order to facilitate the process of learning and discovery by the potential community – a choice of descriptive, non-conflicting names would save the new users some trivial administrative effort through the learning curve.