A LAYMAN'S GUIDE TO INTRINSYC SOFTWARE
AND IT'S BUSINESS PLAN

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To understand Intrinsyc Software Inc., its products and their market potential, one really needs to understand quite a bit about Microsoft first. As the world's largest software business, Microsoft defines the basic rules by which the computer industry operates. Microsoft calls many of the shots today in the software business and to Intrinsyc this means keeping a close eye on them and then staying one step ahead.

Intrinsyc's software is used by programmers in the creation of a myriad of new consumer and commercial electronics products which will run new versions of Microsoft's "Windows" operating system. Intrinsyc's software is a key component in Microsoft's new "Windows Everywhere" revolution. This technology is unique to the computer industry and with it the widespread use of Windows software in new electronics products will occur more rapidly, will cost less and will be more reliable and therefore more successful in garnering market share.

Moving from the comfortable world of the desktop computer to the world of consumer and commercial electronics products is a bold step for Microsoft to make and one which requires a host of new operating system features and development tools to be successful. Intrinsyc has pre-empted this move and is ready today with many of the key tools and extensions needed to get the 3 million estimated Windows programmers worldwide up to speed quickly on delivering on this "Windows Everywhere" vision.

Getting past the technical language . . .

Like all technical fields, software is full of acronyms – these are somewhat obscure abbreviations for technical descriptions of computer technology that engineers and programmers live and breath each day of their lives. This layman's guide to Intrinsyc will avoid the use of acronyms where possible but since so many of them are fundamental to the general state of affairs of the Company, they will be defined clearly before they are used in the description of Intrinsyc's business. Please skip the sections that are explaining terms that you may already be familiar with.

What is an Operating System?

Let's go back to Microsoft. They started by focusing on the lowest level in the software food chain – the operating system (OS). Back in the good old days, DOS (disk operating system) was the OS for the IBM PC and Microsoft made its first $ billions in this narrow market niche. Now what is an "operating system"? Think of it as the lowest layer of software that sits right next to the hardware (the chips and circuit boards).

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The OS handles the tricky software to hardware interface so that the programmers out there who write the "applications" don't have to know too much about the hardware. The OS also handles all of the common resources that each of the applications rely on to operate (such as printer and network communications drivers) and plays an every increasing role in providing seamless connectivity to the Internet.

What is an Application?

An application is the software program that does something useful and unique for the end user. The OS doesn't do anything at all unless it is told to do something by an application (or a group of applications running together). So the hardware actually does the work, but the application tells the OS what to do which tells the hardware what to do. Each level is much like the hierarchy in a business with executives, managers and worker bees handling the operations of the company.

What is a "Desktop" Computer?

This is the world of computers that IBM created with the advent of the IBM PC back in 1982. Before then there were mainframe computers with "dumb" terminals on people's desks. The desktop computer today is the result of a natural evolution and standardization of the original IBM PC design. Today, people talk more about Intel than IBM and that's because old IBM didn't really design much of the original PC – they were in such a hurry to get the design completed that they basically completely out sourced the whole design to Intel (using Intel's chips). Today, Intel is the company that is 99% responsible for the modern day "desktop" computer design from a hardware perspective.

This desktop computer business is really a wonderful example of how the forces of capitalism and economies of scale have driven the cost of computers down while maintaining compatibility between the numerous manufacturers of PCs worldwide. Today's software will run on almost any desktop PC out there and that's been a huge lesson for an industry that was once cranking out proprietary solutions for every new application that came along. Now we're getting into Intrinsyc's business model - moving away from the word "proprietary" in another computing market that is currently dominated by "not invented here" engineering thinking.

What is an "Embedded" Computer?

Embedded computers are found almost everywhere. Cars have at least one. So do robots used in manufacturing. So do medical imaging systems, home entertainment systems, alarm systems and the rides at amusement parks. They're special purpose, dedicated modules that perform defined tasks and their use in the world is ramping up rapidly. As products get more complex, as the need for automatic control, friendly human interfaces and system connectivity builds, companies are designing more embedded computers into their products. The world of consumer and commercial electronics is the world of embedded computing.

If there's a non-desktop computer out there, it can be called an embedded computer – and Intrinsyc's software is being used by programmers to create a whole new generation of "Windows Everywhere" embedded computer products.

Why is the Embedded Computer Market Important?

The embedded software market is expected to grow from US$2.5 billion this year to more than US$5 billion by the year 2000 and this is a market Microsoft intends to capture. Microsoft owns a commanding 90% of the desktop software market worldwide but has not been a player in this embedded market until now. With 10 to 20 embedded computers for every desktop machine, one can appreciate the return on investment Microsoft is pitching to its investors – there is life after the desktop, it's called "embedded computing", and it's a huge opportunity.

What are Microsoft's Plans for the Embedded Computer Market?

Microsoft has a "Windows Everywhere" vision. Their ultimate goal is to put a version of the Windows OS into virtually every electronic product we come across in our daily lives – cell phones, toasters, security systems, automobiles – the list is endless. The benefit is a world without complexity – a world with a standard human interface (Windows) to all of the myriad of electronics devices out there. And don't forget the Internet – it's a given that everything electronic will connect into the World Wide Web and Microsoft's Windows OSes will continue to provide that connectivity.

There are both consumer and commercial aspects to this Windows and Internet enabled world. While consumers would obviously like a simplification of their lives, the commercial world is driven by hard economic factors such as "time to market", lowest cost of development and production, life cycle support costs and reliability. The same economies of scale that won over the desktop computing market for Microsoft and Intel also apply to the commercial world of embedded computers.

Microsoft's First Moves into the Embedded world – Windows CE 2.0 and Windows NT 5.0

The embedded computing world is far different than the desktop market with no two devices looking or acting the same way. There will be a lot of twists and turns in the path to Windows dominance of this vast market and Microsoft will require the support of, and collaboration with, a number of innovative software and hardware companies to deliver on its vision of a "Windows Everywhere" world. Intrinsyc is potentially an important partner in this regard.

Microsoft has started to roll out a new operating system, Windows CE, that is in essence a lean and mean version of Windows 95. Windows CE 1.0 has already shipped to the HPC (handheld PC) market and is targeted to ship as Windows CE 2.0 to the embedded computing market in September. Windows CE 2.0 is intended to become the "small is beautiful" model for this new world order.

In the long run, our current understanding of Microsoft's various product offerings (Windows 95, Windows NT, Windows CE, etc.) will dissolve into a world of "component ware" that is "Win32" based. Win32 is the holy grail of intellectual property (IP) for Microsoft – it is the core of each of their newer Windows based operating systems and is the key defining "value add" for their company. In the end, Microsoft's whole business strategy is to see Win32 based OSes, in a variety of forms in as many different horizontal and vertical markets as possible.

An example of this is the crumbling delineation between Windows NT and Windows 95. It's already impossible for the untrained eye to see the differences on the computer screen as an end user although there are still important functional differences deep down inside. And it's going to get worse with NT 5.0 shipping now as it has been "componentized" to the point where it's going to be hard to tell what software is running on a local machine and what is running on another remotely located machine.

Windows, Windows, Windows – Which one is which?

Here's a quick rundown of Microsoft's current Win32 based OS products:

> Windows 95 – legacy transition OS from the old "16 bit" Windows 3.1/DOS world to the new world of "32 bit computing" (soon to be replaced). A light duty OS for your everyday average guy working in the office.

> Windows NT – currently in version 4.0 release. A serious commercial duty product that is popular with server applications and rugged industrial and engineering applications. With version 5.0, this becomes an even more impressive product that will start finding its way into many new applications.

> Memphis – This is Windows 98, the replacement for Windows 95. Gone will be the remaining "16 bit" legacy hooks and in many ways this product launch will hopelessly blur the distinctions between Windows 95 and NT.

> Windows CE – Again, this is actually a range of different products that are based around Win32 and will come out in different flavors for different target industries (automotive, consumer, etc.)

Where does Java Fit into this Win32 Strategy?

A lot has been written about Java and there's no doubt about its significance to the world of computing. What a lot of people forget is that Java is just another OS looking for acceptance in this market. It is owned and controlled by Sun Microsystems (the same dynamic as Win32 being Microsoft's IP) and it will be viewed similarly to Microsoft's domination of the desktop market today if it truly becomes the next standard in OSes.

One can't talk about Java without addressing the world of network computers (NCs). This brings up the whole discussion of the "thin server/fat client" versus "fat server/thin client" model of networking. We'll explain it all here in plain language but just keep in mind the word "capitalism" and understand that everyone is biased (for or against Win32 or Java).

Thin Server/Fat What?

"Thin server/fat client" is a description of the traditional desktop PC model of computing where all of the OS and applications reside on the local machine and the backroom server handles some basic central file storage and connectivity tasks only. This has been criticized by the Java proponents as being a costly computing model since the desktop computer has become more and more complicated and the maintenance and support of the numerous desktop machines has driven costs up. The counter balance to this is the argument that thin server/fat client computing is fast, efficient and gives the most flexibility and power to the end user (true).

NCs are very much akin to the old dumb terminal/mainframe computing model and that's why they are referred to as a "fat server/thin client" model. These are diskless devices that have less computing power, are maintenance free, and run everything "over the net". This is of course utopia from a maintenance and support perspective but the end users may have to wait a long time before they get used to what may turn out to be a substantial drop in performance, flexibility and efficiency in comparison with their existing desktop machines. Java is touted as the OS of choice for the NC model and it dove tails nicely with the dramatic growth of the Internet (now if we could just solve the bandwidth problems with the Internet . . .).

So Who is Going to Win – Microsoft or the "Anyone but Microsoft" Camp?

In the end, nothing is black and white. The popular press loves to hype Java and NCs which are definitely in vogue at the moment. What will actually happen is that the majority of desktop and embedded computing applications will run a hybrid approach with the use of Java for Internet/Intranet communications and extensive use of Microsoft's Win32 OS as the underlying foundation. Intrinsyc's technology development plans are firmly grounded in this "middle of the road" strategy and its tools and extensions are actually playing a key role in allowing low cost embedded devices to be based on Win32 while having full Internet and Java features and benefits as well.

Where's the Business Opportunity for Intrinsyc?

Intrinsyc is delivering the software tools and extensions needed to turn Microsoft's goal of "Windows Everywhere" into a lucrative opportunity for the more than three million Windows programmers out there who need advanced software tools to create this new generation of user friendly Win32 based embedded products.

Windows programmers are comfortable today with developing Win32 applications for the desktop market where all computers are alike from a hardware perspective. The embedded market, with its infinite variety of hardware platforms, has been a far more challenging task to address until now. Traditional desktop application development work centers around the compiler as the key software development tool - once a new application is compiled and debugged, it can be shipped with confidence to a worldwide desktop market.

Going Beyond the Compiler with Intrinsyc's Tools and Extensions

With Win32 based embedded systems, the compiler tools aren't enough to get the job done quickly and with the necessary features the product may require. Embedded systems are typically very cost sensitive so minimizing the resources required is often important (memory and disk size, processor speed, number of peripherals, the speed of start-up, etc.).This is where Intrinsyc's software come into play by:

- Bridging the knowledge gap between the compiler (which creates executable application), the operating system and finally the target hardware platform itself, and

- Extending the operating system features to provide the functionality required for the application that could otherwise not be provided.

Intrinsyc's Tools give programmers powerful feedback during the design process

Examples of a knowledge gap between the compiler tool capabilities and what Intrinsyc's tools provide to the programmer include:

- Understanding how much memory an application would take (disk space or memory size)

- Understanding which operating system components would be required by the application for it to run in as small a memory "footprint" as possible

- Giving dynamic feedback on what happens to the application and OS when changes to the hardware design are made

- Allowing dynamic changes in the final product's OS (e.g. CE or NT) helping quickly drive the cost of the resulting product down to its lowest possible level while preserving and in many cases enhancing the features and performance of the final product

Intrinsyc's Operating System Extensions provide powerful new features to programmers

Developing Win32 based applications for the embedded market also requires additional features that Intrinsyc's software libraries provide:

- Allowing the Windows OS and the application to be saved onto alternative types of storage media such as CD-ROM, Flash memory (re-programmable chips), or ROM (read only memory chips).

- Providing unique hardware drivers to allow many new types of devices to be communicated with and controlled by the embedded computer

- Providing fault tolerant operation so that any system crashes would be avoided or recovered from gracefully

- Providing "real-time" extensions to the OS so that it is more precise in terms of how and when it executes various bits of the applications that are running on top of it

- Adding customized Java internet communications requirements (NC computing model)

- Adding powerful signal processing capabilities so that data flowing into and out of the embedded computer can be efficiently manipulated (e.g. test & measurement or industrial process control applications)

What kinds of real world applications are there for Intrinsyc's Technology?

Programmers looking to create minimal footprint Windows NT embedded systems with real-time performance, or remotely deploy embedded Windows CE devices need look no further than Intrinsyc's hot new software tools. Anyone who may be dreaming about putting the power and sophistication of Windows NT into less that 16M of ROM – complete with the application and network communications, or wanting to profile their application's use of RAM, ROM and device driver resources, or needing some powerful internet features and signal processing capabilities may find elegant solutions at their finger tips using Intrinsyc's new software tools.

How are Intrinsyc's Software Tools Used by these Programmers?

Intrinsyc's tools plug directly into Microsoft's Developer Studio development environment and provide important new features as well as application and OS level extensions, in the form of embedded systems software libraries, that extend the capabilities of Win32 based applications to a wide range of new products that were previously the sole domain of proprietary OSes.

Microsoft wants Java to be a supporting Internet technology rather than a replacement to Win32 itself and this is the strategy Intrinsyc's tools are supporting. Companies like Philips have already bet heavily on Windows CE for consumer products and many others are quickly joining the fray. Intrinsyc, it seems, has entered the market with the right tools at the right time and the analyst's tend to agree.

What are the Analyst's Saying about Intrinsyc?

"We see Windows CE as a real opportunity to open up sensors and controllers, and using things like Rainbow [Intrinsyc's new web server technology] will definitely make that information available," said Bill Thompson, a senior analyst at Automation Research Corp. in Dedham, Mass. "To serve that information up onto a standard Internet/intranet format is definitely exciting. It also goes along with Microsoft's push to make their Windows solution scalable downward as well as upward," Thompson said.

Client Server News of New York stated, "Intrinsyc's web server can run on top of Microsoft's Windows CE, the first of its genre and a key function Redmond needs in its battle to defeat Java in the embedded controls market. Java's been heavily touted for such applications, handled now almost exclusively by custom mini-OSes, but Redmond's just as loudly touting NT-based networks with CE on the controllers."

Who is selling Intrinsyc's Products Today?

Intrinsyc's products are being marketed by Allen Crawford Associates (http://www.aca.ca) in Canada, by Wizard Information Systems (http://www.wizinfosys.co.uk) in Europe and the Middle East, and by RadiSys Corporation (http://www.radisys.com) worldwide as part of its strategic software alliance. Intrinsyc is also working on distributing its products directly through Microsoft and Intel.

Who are the End Customers?

Initially Fortune 500 companies. Eventually, all 3 Million Windows programmers.

Where will the revenues come from (Delivery Mechanism vs. Content)?

Initially, the sales of the tools will generate significant early stage revenues but the medium to long term corporate revenues will come from the "runtime" licenses that the operating system extensions and other software libraries will provide to the Company. For each and every software tool suite that is sold, literally hundreds of thousands of runtime licenses could be generated in the long term.

Think of the software tools as the "delivery mechanism" for the software runtime components or "content". The more products that are produced that use Intrinsyc's "content" in their operation, the better the long term revenues and profitability of the Company will be. The long term strategy will be to lower the cost of the delivery mechanism (lower the barrier to entry) to encourage maximum use of the content in end user products. This is where Microsoft will be making its money too (selling a copy of a Win32 OS for each and every consumer and commercial Windows based product that is sold).

In a Revenue Model based heavily on Content, specifically what Content is hot today?

First of all, the tools themselves are a hot product today. Fortune 500 companies are the initial marketing focus and therefore a premium price for a high quality product will be sought (IX sells today for US$10,000 without content). Second of all, Intrinsyc has the 3 most important pieces of content required in the embedded industry today:

1.   Fault Tolerance – Intrinsyc has the world's first software based fault tolerant solution for Win32 applications (as featured in Byte magazine). Soon to be released for Java as well.

2.   Windows CE based Web Server – already receiving world wide attention as the first technology of its type on the market today and a key technology Microsoft needs in its battle with Win32 against Java. Intrinsyc's Rainbow technology now provides full internet capabilities (including Java and ActiveX) to any CE based device.

3.   Real-Time performance – in partnership with RadiSys Corporation (and via their largest shareholder Intel), Intrinsyc offers the world's first production shippable real-time extensions for Windows NT (and soon for CE as well), called INtime.

Intrinsyc continues to lead in the development of more key "content" and will also be releasing versions of its SP product as part of this content development initiative. Intrinsyc is also in negotiations with a number of prominent software companies to use Intrinsyc's delivery mechanism for their software content (as per the RadiSys INtime relationship) under an OEM licensed basis.

What are the key risks with Intrinsyc's Business Model?

There are a number of risks, many in different areas as follows:

- Competition may come from a number of different sources: compiler tool vendors who wish to extend their business model into this new embedded tools area, Microsoft itself, and other new startups. In the Internet age, speed of execution and quality are tied together. Intrinsyc will only stay ahead via constant innovation and key partnering to gain access to distribution channels to quickly obtain market dominance (with the goal of becoming the defacto "delivery mechanism" and "content" standard).

- Failure to execute: Intrinsyc has a world class development team and management team. However, any serious errors of judgement or technical miscalculations or errors could threaten the long term viability of the Company at this early stage in the market development.

- Failure to accelerate development and marketing: Intrinsyc's market anticipation and timing has been excellent up to now. World wide attention is now being paid to the Company and its technology. With that attention comes demands from a great many directions which will require a combination of focus as well as expanded development and marketing efforts. Lack of financing or lack of availability of key new technical resources could seriously affect the growth prospects of the company.

- Failure by Microsoft to deliver its products to market in a timely fashion: If Microsoft drops the ball on the release of Windows CE 2.0 or if other significant technical issues outside of the control of Intrinsyc impede the market acceptance of the Company's technology and products, it would result in being too early to market with the further result of a significant lack of short term revenues and possibly the creation of stiff new competition (that would have had a chance to catch up to Intrinsyc).

Who are Intrinsyc's Competitors?

Intrinsyc's products are not competitive to other software vendor's compiler tools today (companies such as Microsoft, Borland, Symantec, and Metrowerks). Intrinsyc's products are complimentary to these products and technologies.

Intrinsyc is positioned at the beginning of a new market cycle and there is only one other potential competitor out there today, VenturCom, of Boston, Mass. who has defined embedded tools and extensions for Win32 based systems as their business model as well. Intrinsyc was working with VenturCom earlier this year to try and integrate their real-time Windows NT extensions and their Component Integrator (CI) product with Intrinsyc's Integration Expert (IX) product line. In the end, Intrinsyc partnered with RadiSys, a competitor of VenturCom's in the real-time arena, and now RadiSys and Intrinsyc are co-marketing and co-developing products together for the "Windows Everywhere" embedded market.

VenturCom's CI product performs some targeting functions that are similar to Intrinsyc's IX product at the OS level, but in a different manner and for potentially different customers. IX focuses on application level (first and foremost) and OS level independent automatic target generation (any Win32 OS target) while CI is a manually coded database for the creation of minimal footprint NT 4.0 systems only. Ultimately, CI may produce a smaller footprint for an NT 4.0 system than IX (the natural result of an automatic versus manually coded approach) but IX offers many other features that appeal to the programmer other than NT 4.0 only targeting needs. Intrinsyc feels that CE should be used in embedded applications where very small footprint requirements are specified and IX can be used to make these NT vs. CE analyses and trade-off decisions by the developer dynamically while the application is being written. IX is also always current and up to date with any version of Win32 because of its automated approach to dependency analysis from the application down to the OS.

Intrinsyc is attempting to establish IX as the defacto industry standard for embedded systems target generation and code analysis as an extension to Microsoft's Developer Studio product and should quickly achieve this goal in the next year. From that point onwards, it is important for Intrinsyc to generate cash flow from "runtime" licenses (such as the Company's WinFT, Rainbow and SP software components). There are also many other potential strategic alliances Intrinsyc is looking at with Electronic Design Automation (EDA) companies, as well as other embedded hardware manufacturers and software tool vendors. The list goes on and on. The opportunities are truly exciting.

Spotlight on Intrinsyc's Products and Technology . . .

Intrinsyc IX - Component Analysis and Target Generation

Intrinsyc IX (Integration Expert) provides component analysis and management capabilities that simplify tasks associated with application development, operating system configuration, and target generation. Intrinsyc IX assists developers in the creation and deployment of minimal footprint Win32 applications and systems.

Developers can use Intrinsyc IX to analyze and manage a set of programs and libraries that comprise a single target application. Suppliers of operating systems, device drivers, and hardware can use Intrinsyc IX to provide configuration data for subsequent use by application developers during target generation.

The key features of Intrinsyc IX include automatic application dependency analysis, profiling, OS configuration, and target generation. The analysis is dynamic, requires no source code, provides automatic footprint calculation, and works for any version of Windows NT or CE. Integration capabilities include:

- Automatic Dependency Analysis -- inspection and profiling techniques to derive and capture static and dynamic relationships between the application and OS layers; and application metadata management and visual display of arbitrary collection of software components.

- Profiling -- calculation of total target footprint; and improvement of code quality through optimization of compiler flags and statistical analysis of run-time memory usage.

- Configuration -- development of a comprehensive information model to represent OS and hardware, as well as to use information generated by industry standard and third party OEM Adaptation Kits (OAKs).

- Target Generation -- deployment of software components managed in the information model to the target platform.

- Intrinsyc IX also provides seamless integration for developers who plan to work with the RadiSys INtime real-time extensions for Microsoft's Win32 OSes. These capabilities offer an ideal solution for customers who need a small target footprint combined with a real-time Win32 based OS for their embedded applications or systems.

Intrinsyc WinFT – Fault Tolerance

Intrinsyc WinFT provides fault tolerance at the application level. This enables the detection and recovery from faults that cannot be resolved by hardware techniques or by the operating system. It's unique approach to fault detection and correction enables Win32 developers to improve the availability and reliability of their applications in a cost effective manner. Intrinsyc WinFT provides even greater value for embedded systems where alternative means of fault tolerance can be cost prohibitive.

Intrinsyc WinFT was designed for developers and administrators of fault tolerant Win32 applications and systems. Developers can use the simple API provided to quickly and easily build fault tolerant features into their applications. Administrators can use the Intrinsyc WinFT to configure and monitor their fault tolerant systems to ensure optimal performance. A full featured demo version of this product can be downloading from Intrinsyc's web site.

Intrinsyc Rainbow - Thin Server Communication Technologies

Intrinsyc Rainbow simplifies the development of Internet-enabled embedded devices by providing a simple application programming interface (API) to a small footprint Web Server. It is believed to be the world's first web server software for Windows CE. This highly efficient and compact web server software has the potential to allow millions of Windows CE based embedded computers to be accessible directly on the internet using commonly available web browsers such as Microsoft's Internet Explorer and Netscape's Navigator.

Intrinsyc Rainbow implements both HTTP and IIOP communications layers as well as full Java and ActiveX support, dynamic system calls and Windows CE file system support. A live product demonstration is available on the Internet at http://rainbow.intrinsyc.com .

Intrinsyc SP - High Performance Signal Processing

Intrinsyc SP is an integrated software development and runtime environment that enables developers of "test & measurement" dedicated systems to rapidly create and deploy applications for acquisition, control, logging, monitoring, and processing. The visual application development environment provided by Intrinsyc SP allows users to rapidly prototype, build, test, and deploy their target applications using advanced yet simple to use signal processing modules.

Application developers can pick from among hundreds of proven user interface, control, and processing components to develop their applications. Some of the key capabilities provided by Intrinsyc SP's integrated application development environment include:

- High Performance Data Acquisition - support for a wide range of multi-channel data acquisition boards from leading manufacturers.

- Data Import/Export - Data can be exported to a file, streamed dynamically to disk, or viewed simultaneously in other applications, such as spreadsheets.

- Display, Control & Processing Components - Develop application using any of the hundreds of proven components.

- Internet Enabled - TCP/IP based network components facilitating the development of distributed processing and control applications.

Intrinsyc SP is currently providing significant productivity improvements for applications in the following industries: Test & Measurement; Process Control; Power Generation; Oil/Gas Production; Municipal Infrastructures; Defense & Space; Consumer Products; and Scientific Analysis & Research.

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