MARKETING PLAN FOR A
HIGH PERFORMANCE XML PROCESSING TECHNOLOGY

by

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ABSTRACT

A venture founded by Dr. Robert D. Cameron endeavours to offer a software product, which optimizes the processing performance of the Extensible Markup Language (XML). The objective of this proposed research is to provide a comprehensive analysis of the market opportunities for this venture. This plan seeks to identify the optimal market niche, profile potential customers, analyse the decision/purchase process, gather market requirements, and provide demand estimation. Moreover, this analysis identifies suitable target segments and defines the appropriate product position to achieve differential advantage. The highlight of this plan is the exploitation of market opportunities, which enable rapid commercialization and provide substantial positive financial impact. These opportunities are attainable through a proactive approach to licensing technology, teaming-up with technology providers, and partnering with reputable local and regional technology suppliers to reduce competition, improve pricing, and reduce risks. This plan includes a competitor and business risk analysis to mitigate and reallocate risk.

EXECUTIVE SUMMARY

The Extensible Markup Language (XML) is used to exchange data on the Internet and corporate information networks in a platform neutral manner. As the volume of XML network traffic continues to grow, the demand for the high performance XML processing solutions continues to increase. The XML performance optimization market reached $2 billion USD in 2008. This figure represents a 2000 percent growth over the $86 million USD reported in 2002. Overall, the projected growth of the XML performance optimization market is $3.2 billion USD by the end of 2013. Within this timeframe, the market potential for software based XML solution is estimated to reach $1.6 billion USD.

A recent trend in the commodity processor market is that research and development in single core architectures with higher clock speeds has ceased. Instead, multicore and manycore commodity processors, which demand less power and generate less heat, have become the standard processors found in desktop computers and low-end servers. This venture's proprietary technology leverages this industry trend. In addition, this venture has identified significant performance gains obtainable through the Single Instruction Multiple Data (SIMD) capabilities of modern commodity processors. In combination, multicore technology used together with SIMD technology represents an unprecedented performance opportunity for XML processing software in general and this venture in particular.

Dr. Robert D. Cameron who discovered and patented high performance SIMD based XML data processing founded this venture. A computing science graduate student and I are writing a business plan to commercialize this particular technology. This venture's proposed product is a high performance XML processor, which targets high performance XML solutions software developers. The proposed product utilizes patented SIMD technology to accelerate XML processing and delivers significant performance gains over the offerings of its competitors'.

The mission of this venture is to provide the highest performance XML processing software available on the market and develop into a leading high performance XML processing solution provider. This business endeavours to offer optimized XML processing solutions to large and medium-size enterprises through value added resellers (VARs) which include system integrators, solution providers and high-tech consultants. Keys to success are securing financing, accessing complementary assets, and accelerating product diffusion. As a startup, this venture will pursue a cooperative strategy to reduce competition and risk and attempt to establish strategic relationships with key partners to gain access to the complementary assets while simultaneously building complementary relationships with competitors. This venture can achieve this through the hiring of key personnel, which possess industry connections.

When competing with incumbents through the product market, this venture must utilize value added resellers to provide a 'whole product' solution. Whole product solutions include, but are not limited to, product support, commercial licenses, system integration, and training. This venture needs to compete on performance and not price. The performance qualities of this product are a key component in this marketing mix. In addition, when marketing this product through a company website, this venture not only advertises with online advertising firms, but also utilizes partner website to promote its products and services to enterprise customers in order to stimulate demand. Generated demand via product promotions supports the motivations of distribution channels to distribute the product.

ACKNOWLEDGMENTS

The BC MBA Access to Commercialization Scholarship (BC-ACS) is a BC Innovation Council (BCIC) Accelerated Commercialization Enhancement (ACE) Program, which provides MBA students with the opportunity to participate in a real world business planning process. The aim of the scholarship is to partner one or more MBA students with one or more graduate students conducting research, which holds the potential for commercial success.[1] BC-ACS participant, Mr. Patrick Lam, a MOT MBA student at Simon Fraser University, was given the opportunity to collaborate with Simon Fraser University computing science graduate student, Kenneth S. Herdy, to develop a marketing plan for an innovative technology. Mr. Herdy's research focus of high performance XML processing, conducted under the direction of Professor Robert D. Cameron of Simon Fraser University, provided the opportunity to investigate the marketability of an innovative technology in the domain of software based XML processing. The author of this dissertation wishes to express his sincere thanks to Mr. Kenneth Herdy and Mr. Mark Bodnar for their kind support and assistance in the preparation of this manuscript, and the guidance of Dr. Pek-Hooi Soh, MOT MBA project supervisor. Furthermore, the author is grateful to all staffs of Galdos System Inc. for their invaluable suggestions in the preparation of this dissertation.

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GLOSSARY

Bandwagon effect   The bandwagon effect is an observed social behaviour in which people tend to go along with what others do or think without considering their actions.

Hardware appliances   Hardware appliances are pre-packaged hardware and software solutions optimized to perform a limited number of processing activities.

Web Services   Web Services allow incompatible software systems to communicate. Web Services use XML as a data exchange data technology.

XML   Extensible Markup Language, (XML) is a scheme for attaching meaning to data. XML documents use tags to attach the meaning to data. As long as systems agree on the definition of the tags, data can exchange can occur seamlessly.

XML library   Software libraries are packaged software modules having common functionality. XML libraries are collections of functions written to fulfil common XML processing tasks. Depending on the programming language used to build an XML processing application, for example, C++, Java, CSharp, a software developer is required to obtain an XML library developed specifically for use with the same programming language.

XSLT   Extensible Stylesheet Language Transformations (XSLT) is an XML-based language used for the transformation of XML documents into other XML or "human-readable" documents.

1: INTRODUCTION

1.1 New Venture and Product Concept

The Extensible Markup Language (XML) is a platform neutral technology used to facilitate the exchange data over the Internet and corporate information networks. To meet the increasing XML processing demands of the market, several companies manufacture custom XML processing hardware. However, custom hardware burdens customers with significant investment in short term solutions. Dr. Robert D. Cameron, Professor of Computing Science at Simon Fraser University, has developed and patented an XML data processing solution based on the Single Instruction Multiple Data (SIMD) technology. This patented technology offers previously unattainable long term software-based XML processing performance. Through this proprietary technology, a venture founded by Dr. Cameron endeavours to offer a software-base solution, which optimizes the processing performance of XML. The proposed solution intends to fill the gap in a market niche and creates competitive advantage by reducing significant upfront hardware cost and maintenance cost for customers while at the same time offering the potential for continued increases in XML processing performance. Consequently, this venture seeks to commercialize this particular technology. A market analysis of this proposed technology serves as partial fulfilment of the requirements of the Simon Fraser University MOT MBA program.

1.2   The Stakeholders

The stakeholders of this project include the following persons, groups, or organizations:

- Dr. Robert D. Cameron, Professor of Computing Science at Simon Fraser University, conducts research in high performance XML processing leveraging the SIMD (Single Instruction Multiple Data) capabilities or modern commodity processors. Professor Cameron holds several patents in high performance SIMD based XML data processing.

- Mr. Kenneth S. Herdy, computing science graduate student at Simon Fraser University under the direction of Professor Cameron and together with collaborating industrial partner, Galdos Systems Inc., conducts research focused on the analysis of techniques, which improve XML processing performance in the context of the Geography Markup Language (GML).

- Galdos System Inc., a Vancouver based software and services company, delivers geospatial infrastructure solutions to international businesses and governments to enable the real-time distribution and management of their geospatial data. Galdos is an industrial partner in this project and will provide general business advice and assist in market research component.

- Mr. Patrick Lam, MOT MBA student at Simon Fraser University, together with Mr. Herdy and Galdos Systems Inc., conducts industry market research in the XML performance optimization market.

1.3   Objective

The objective of this project is to provide entry and growth strategy for this venture, which enable rapid commercialization and provide substantial positive financial impact. Before launching a new product, conducting marketing analysis is the first step in determining if there is a need or audience for the proposed technology. First, I identified unique features of the product and evaluate how many months it will take for customers to cover the initial purchase price of the product or service as a result of its time, cost, or productivity improvements. I then identified the present state of development of the product and how much time and money will be required to fully develop, test, and introduce the product or service and outlined any patents, trade secrets, or other proprietary features of the product. After evaluate the application and benefit of the product to be sold, I conducted detailed marketing analysis.

To begin the market analysis process, I developed a set of questionnaires that enhanced my understanding and knowledge of this venture's target market and industry, and ultimately determined if there is a need for the proposed technology. This analysis focused on both primary and secondary research. Primary research included focus groups, qualitative surveys and phone interviews with potential customers or outsiders who have knowledge about the industry or product. Secondary research was accessed in libraries, online, books, etc.[2] Through the Internet, I obtained valuable marketing analysis

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[2]   Virtual Advisor Interactive Inc., (2004). Conduct a Market Analysis, Retrieved Dec. 14, 2007, from <http://www.va-interactive.com/inbusiness/editorial/sales/ibt/market_analysis.html>

information to conduct a competitive analysis. Data obtained in both primary and secondary research was analysed and interpreted in analysing the market. The research results were used to make marketing decisions and develop entry and growth strategy for this venture.

1.4   Structure

The essential concept of market analysis is the actual assessment of the target population, competition and needs for marketing a product. An important part of this project is the forecasting market potential for the proposed technology. This project seeks to indicate the size of the current total market, estimate the potential annual growth for five years of the total market and identify the factors that affect market growth. This project also seeks to identify who the customers for the product are or will be, who makes the buying decisions, and how long decisions take. Another part of the project will involve identifying any major competitors. This includes the analysis of the strengths and weaknesses of competitors and each competitor's market share, sales, distribution methods, and product capabilities. The findings of market analysis lead to the next step, which was the development of an action plan for commercializing such technology.

2: OVERVIEW OF THE TECHNOLOGY

The Extensible Markup Language (XML) is a general-purpose specification for the creation of custom markup languages. The adjective 'extensible', in the term XML, refers to the capability of XML authors to 'extend' the base XML syntax and define custom markup tags and attributes useful in the description of application data. XML syntax describes the data but not the visual presentation of data. The primary purpose of XML is to facilitate the exchange of data between different information systems via the Internet. Related XML processing technologies serve to specify the rendering of an XML document. Because XML distinguishes content from presentation, a single XML document may contain information destined for a variety of end user devices such as web browsers, cell phones and PDAs.

In general, XML is a platform neutral data format, which, by virtue of this platform neutrality, does not target any particular end user device. Consequently, a requirement often arises to translate source XML document encodings to particular destination device formats. The Extensible Stylesheet Language Transformations (XSLT) specification addresses this requirement. To accomplish the transformation task XSLT makes use of XSLT stylesheets. XSLT stylesheets are text documents, which define specific transformation rules used to translate source XML document instances into specific destination device data formats. An XSLT processor interprets an XSLT stylesheets and then applies the transformation rules to an XML specific document

instance to produces the destination data. For example, an XSLT processor may transform an XML encoded document to either Portable Document Format (PDF) or Hyper Text Markup Language (HTML) depending on the XSLT stylesheet applied by the XSLT processor. To clarify this process, Appendix A contains a simple example of an XSLT based transformation. In summary, XML data describes data used in a variety of domains and there exists a need to translate XML data formats to other formats for a variety of purposes, which include data integration and end user data visualization. On-demand translation, whether to HTML, PDF, or some other form, is recognized as a common application server use case as shown in Figure 1.

Figure 1 XSLT used in the Transcoding Publisher Server
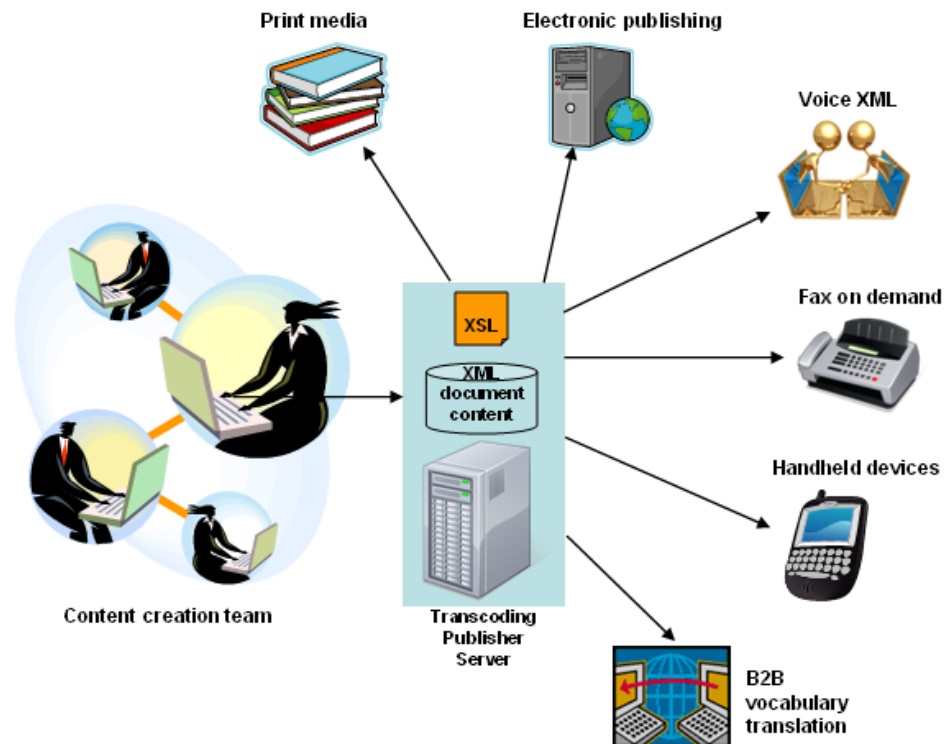
The above diagram is created by the author based on Figure 4 from ibm.com (Colan, 2001).

In general, the transformation of large volumes of XML data requires significant processing power. The current parsing technologies with specific hardware are unable to meet the performance demands of XML-based computing infrastructures. In order to manage large volumes of XML data efficiently, a venture developed software based XML transformation solution built based on commodity processor technology to leverage the performance benefits of processing XML data. Consequently, this plan seeks to provide a comprehensive analysis of the market opportunities for this venture.

3: MARKETING ANALYSIS

The following sections describe the existing and projected marketplace in which this venture will introduce its product. The sections also identify the product life cycle of the proposed solution and analyze the competition in the context of XML performance optimization market.

3.1   Market Problem

3.1.1   XML De Facto Integration Systems Standard

The challenges of large-scale electronic publishing shaped the original design of XML. As the de facto standard of web data representation and exchange, multitudes of applications have been developed based on XML. Examples include stock exchange applications, news subscription applications, business-to-business middleware and so forth.

Many challenges in the processing of semi-structured XML data have appeared with the increased reliance on the Internet. A core challenge in XML data management rests in the efficient transformation of XML data into various other document formats. As the quantity of XML data content in the enterprise systems continues to rise, the efficient management of XML data sources has become a significant problem. Data integrators desire the many benefits of using XML for data interchange but the transformation of large volumes of XML data requires significant processing power. A conservative

estimate is that it takes 26 times the computing power to handle XML encoded data than to handle the equivalent binary encoded data (Mimoso, 2004). Consequently, a recent approach to accelerate the processing of XML data sources is to use custom XML hardware based solutions, commonly known as XML appliances.

3.1.2 Limitation of XML Network Acceleration Appliances

Large XML data sets are typical in domains such as Geographical Information Systems (GIS) and Bioinformatics. The Geography Markup Language (GML) is a (XML) grammar for the encoding, transmission and storage of geographical information processed by GIS. GML serves as a modelling language for geographical information as well as an open interchange format for geographical transactions on the Internet. GML enables Internet-connected devices to exchange geographical information, including, for example, merchant locations and traffic conditions. However, despite the usefulness of GML, a significant drawback of GML is that large data sets are common. To meet the market demand for high performance GML processing solutions, hardware appliance companies build custom appliances, which are readily configurable to process GML.

An XML appliance is a computer hardware component, which, for performance reasons, typically serves the deliberately narrow purpose of XML document transformation. It performs a variety of tasks, including tasks such as verifying an XML document does not contain malicious code, transforming XML into other formats such as HTML for Web browsers, routing XML to appropriate Web services or applications, authenticating XML to ensure that it is from a trusted source, and encrypting XML to

hide data content. A number of XML appliances rely on specialized hardware and software to accelerate the processing of XML data whereas others accomplish the XML transformation task using standard operating system calls together on top of standard hardware. Since market demand for faster commodity processors drives continued improvements in commodity processors, commodity processor improvements continue to outpace the relative improvements in custom XML hardware. This results in a restricted lifetime of such XML appliances of typically only for three to five years.

In addition, although the current processing performance of XML is adequate for many applications, processing speed remains problematic in more demanding application domains, which exchange, process and store large volumes of XML data. It is increasingly clear that the advantages of XML-based applications result in heavy performance penalties and that the current parsing technologies are unable to meet the performance demands of XML-based computing infrastructures.

3.2   Market Opportunity

3.2.1   Advantages of Software Based XML Solutions

In order to manage large volumes of XML data efficiently, a software based XML transformation solution built based on commodity processor technology to compete with existing custom XML hardware solutions is proposed. The most remarkable characteristics of this proposed technology are that it leverages the performance benefits of processing XML data with hardware features available in standard commodity processors, and that the potential for continued increases in XML processing performance

will continue well into the future without the need to upgrade, purchase or configure

special purpose hardware. A clear advantage of a software-based solution over a

hardware-based solution is that software is easier and faster to update and modify.

Enhancements, updates and modifications in software approaches are low cost in

comparison to updates and modification to custom hardware appliances. With hardware-

based XML appliances, modifications and enhancements often require the physical

configuration and the shipping of a new device. Software-based solutions allow

customers to reduce significant upfront hardware cost and maintenance cost, and at the

same time enhance the processing performance of XML. These advantages create a

differential advantage of software-based XML processing solutions over hardware-based

solutions.

3.3   XML Performance Optimization Market

3.3.1   Market Size and Growth

Over the last past decade, the worldwide XML performance optimization market

has experienced exponential growth and evolved into a multi-billion dollar industry.

Table 1 shows the revenues of current market suppliers for 2004 through 2007. A recent

research report from Wintergreen Research Inc. estimates that XML processing market

valued at $86 million in 2002 will reach $2 billion by 2008.[3] This represents an increase

of approximately 2000 percent over the last five years.

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[3]   Wintergreen Research, Inc., 2003. XML Processing and Wirespeed Messaging Market Opportunities, Strategies, and Forecasts, 2003 to 2008, from www.wintergreenresearch.com

A recent research report from ZapThink LLC estimates that XML traffic on corporate networks will grow from approximately 15 percent in 2004 to over 50 percent by 2008 (see Figure 2) and that Web services traffic will account for up to 80 percent of all XML traffic by 2010 (Mimoso, 2004). With the dramatic growth in the volume of XML traffic, XML processing has become increasingly important.

This exponential growth in XML traffic drives the worldwide demand for XML performance optimization solutions. ZapThink reports that the XML performance optimization market is becoming "very big business" and predicts that the market will reach $1.2 billion by 2010. This strong growth is a result of the economies of scale brought by the network systems that implement savings of a factor of ten to fifty over processor and application XML processing costs.

Based on the projected growth in XML network traffic volume due to Web Services and corporate network traffic, the XML performance optimization market is expected to continue to grow at an annual rate of 10 percent per year over the next 5 years. The size of the XML performance optimization market is estimated to reach $3.2 billion within this timeframe. Under the assumption that 50 percent of the market share will be captured by software-based solutions, it is expected that the total market sales volume potential for software based XML solutions will reach $1.6 billion USD over the next 5 years.

Table 1 Analysis of revenues by current market suppliers

XML Appliance Vendors	Date of incorporation	2007	2006	2005	2004
		(all numbers in $000 USD)			
Cast Iron Systems, Inc	2001	N/A	$6,700	$2,100	N/A
Citrix Systems	2007	$290	N/A	N/A	N/A
DataPower Technology, Inc.	2003	$4,900	$5,500	N/A	$1,259
Radware, Inc.	1996	N/A	$12,600	$77,600	N/A
Reactivity, Inc.	1998	N/A	$6,100	$15,000	$2,500
F5 Networks	1996	$525,667	$394,049	$281,410	$171,190
Forum Systems, Inc.	1990	N/A	$1,000	N/A	N/A
InfoTone Communications	1998	$420	N/A	N/A	N/A
Sarvega, Inc.	2005	$5,500	N/A	N/A	N/A
Sonoa Systems	2005	N/A	$240	N/A	N/A
Stampede Technologies	1995	N/A	$2,200	N/A	N/A
Layer 7 Technologies, Inc.	2002	N/A	$2,936	$2,982	$1,038

Created by author with data compiled from MINT Global Database.

Figure 2 Growth of XML traffic

Network Traffic Utliization
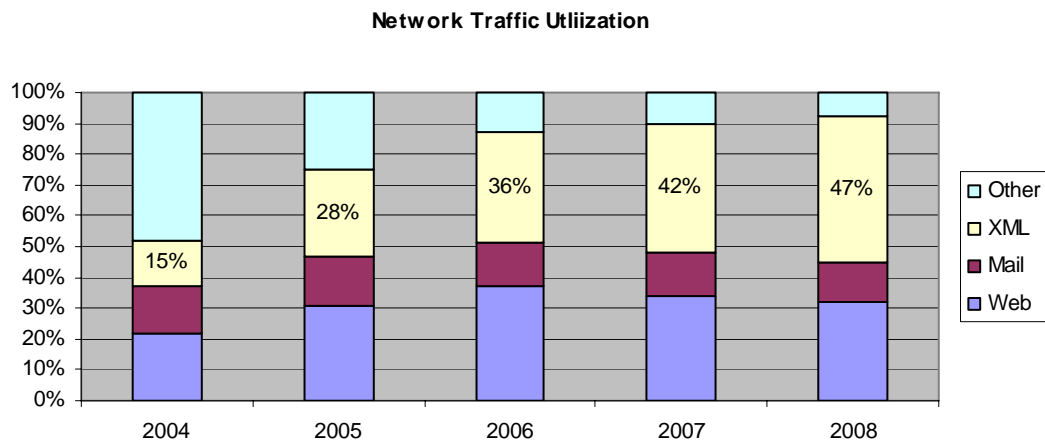
Created by author with data compiled from ZapThink LCC, 2004.

3.3.2   Product Life Cycle

The XML performance optimization market, currently dominated by hardware appliances vendors, is now heading into the end of its growth curve and has evolved into a mature segment. In general, during the product life cycle's maturation stage, competition increases and prices drop. This trend is due to the proliferation in competing products, which result in a reduction in total industry profits. An increase in the number of competitors together with market consolidation is a clear indicator that a market is entering the maturation stage. In 2001, the number of hardware appliance vendors numbered only five but as of 2007, the number had grown to over 15. In addition, in this same period the XML performance optimization market experienced market consolidation through mergers and acquisitions by larger corporations.

Due to recent advances in commodity processors used in desktop computers and low-end servers, software based XML processing implementations are beginning to appear in the marketplace. As such, this venture is targeting software based XML processing to capitalize on the anticipated market growth and aims to profit from the early market opportunities. Thereafter, this market will experience continued growth. This anticipated growth is attributable to the predicted adoption of software based XML software solutions by an under-serviced enterprise customer market with a high desire to adopt high performance XML software solutions. Figure 3 shows the current product life stages of both hardware appliances and software based XML processing solutions. This figure demonstrates that software based solutions are now poised to enter the growth phase of the product life cycle.

Figure 3 Software based XML solution restarts the product life cycle
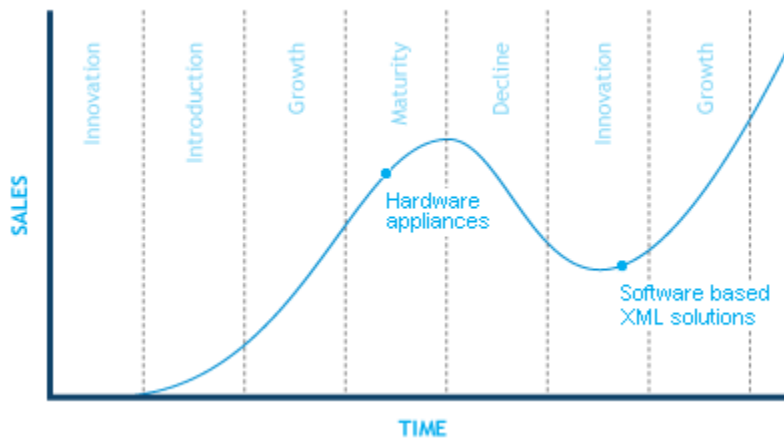
3.3.3   Market Trends

The hardware appliance market has demonstrated strong growth, but with the challenges imposed by hardware based XML processing technologies the market is predicted to shift to adapt to a more flexible and scalable software based solutions. As described below, several factors influence the move to software based XML optimizations.

3.3.3.1 Opportunities in Large and Medium-Sized Enterprises

In the past, hardware based XML solutions such as XML hardware appliances were frequently used to enhance high volume network-based XML processing performance. Arguably, at that time, hardware based XML solutions may have been the best alternative since competing software based solutions were simply unable to provide a similar level of performance. However, there is evidence that customers would prefer the software approach if that software could provide a similar level of performance as the custom hardware.

According to Ray Beaumont, technical architect at Hemscott, his firm first looked at software options, but could not find any that could yield "orders of magnitude faster" XML processing performance (Bednarzm, 2002). Beaumont said he would have preferred a software solution over adding specialized hardware that could potentially fail. Hemscott's comments imply that with the advent of high performance software based solutions, customers may prefer optimized software approaches over custom hardware. Several factors encourage this preference for software. In general, software is more flexible and can be modified more easily. On the contrary, if the modification of a hardware appliance is required, because of a design error or a change driven by customer requirements, the outcome is frequently lengthy and costly delays, together with additional integration costs.

3.3.3.2 The Widespread Emergence of Multicore Processors

A recent technological trend in commodity processors from single core to multicore and many cores processors is driving the development direction of high performance software in general, and providing an increase in the performance potential in software based XML solutions in particular. Due to the physical limitations imposed by excessive heat production and power consumption of single core processors, chip manufacturers are building commodity processor with multiple simple cores rather than faster single core. Interestingly, software designed for single core processors, such as for the Intel Pentium 4 processor may actually run slower in future on newer processors such as the Intel Core 2 Duo, or the Intel Xeon processor due to lower clock speeds. This implies that to realize software performance gains attributable to future processor

technology improvements, software of the future must be designed and implemented to scale and utilize additional cores as additional cores become available.

When performance is a requirement, as is the case in many network applications, customers desire a forward-looking solution that will provide them with continuing performance gains. As a result, software based XML processing based on multicore software design techniques is expected to receive widespread adoption and to provide continued performance improvements with lowered future developments costs.

3.3.3.3 More New Players and No Consolidation

Intel has capitalized on the opportunity of software based XML processing and released the Intel XML Software Suite (XSS) version 1.0 earlier this year. XSS is a collection of Java and C++ based libraries that implement commonly required XML processing functionality.[4] Intel's solution was developed to support multicore and consequently provides a solution that scales well with the addition of future cores. Intel made a design decision to implement the library in software rather than hardware. Intel's aggressive move into software provides insight into where the market opportunities lie and signals a change in Intel's target customers. Previously, "Intel aimed its technology mostly at OEMs, it now hopes to sell directly to enterprise customers as well." (Dornan, 2007)

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[4] Intel Corporation, 2008. Intel XML Software Suite 1.0 2008 Intel Corporation, Retrieved June 13, 2008, from http://www.intel.com/cd/software/products/asmo-na/eng/366637.htm

3.3.4   Adoption Forecast

To forecast the adoption of software based XML solutions, a new product diffusion model, commonly known as the Bass model, was constructed. This model was developed based on an analogous product that has similar diffusion characteristics to software based XML solutions. Since software based XML solutions are considered as the "next generation" of XML hardware appliances, the past adoption of industry standard servers may be regarded an analogous product. Appendix C shows in detail the below Figure 4 construction.

Figure 4 presents an adoption curve for software based XML solutions. The analysis of analogous products indicates that software based XML solutions will demonstrate a slow rate of adoption in its first two years following the initial release. It is anticipated that this rate will accelerate rapidly throughout years 2 to 9 based on the expectation that it will take several years before there will be a sufficient number of system integrators from whom the enterprise customers will seek information regarding software based XML solutions as a viable alternative to custom XML hardware appliances. However, once a sufficient "critical mass" is reached at the end of year 2 the strong imitative effects will take over and enterprise customers will adopt software based XML processing solutions en masse.

Figure 4 Demand forecast for Software Based XML solutions based on the Bass Model
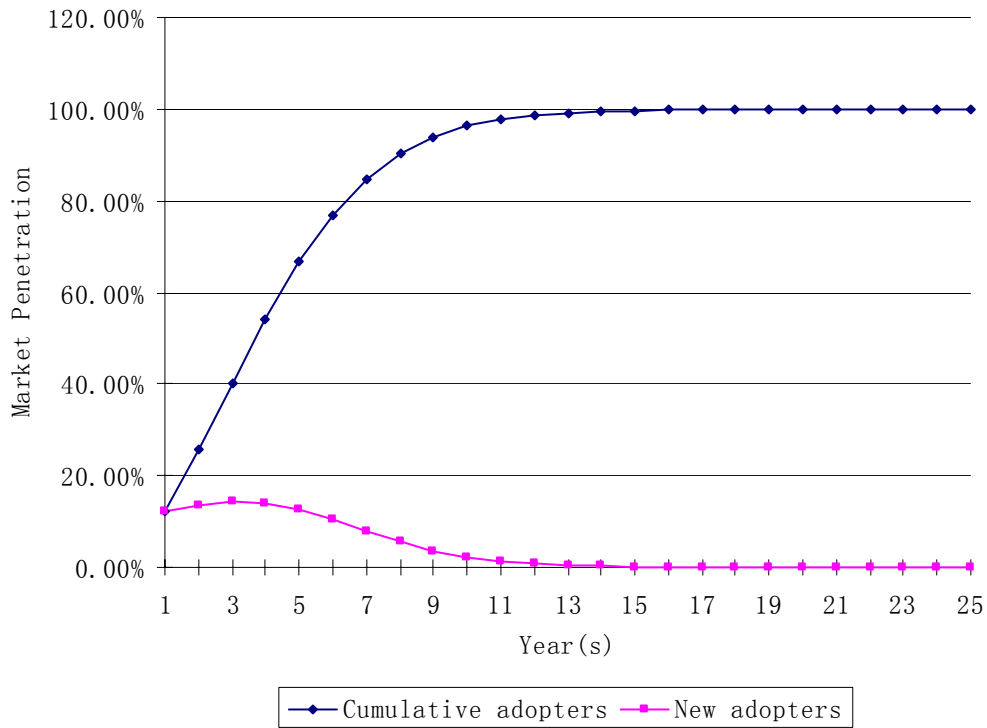
3.3.5 Market Demographics

The worldwide XML optimization market can be segmented by customer type based on several factors such as the size of the organization, the industry, and position in the value chain. Figure 5 shows the position of each segment in the technology adoption lifecycle. The current XML hardware appliance buyers and users are the most probable customers of the software based XML solutions. A summary of findings with respect to purchase decision influencers of each segment is located in Appendix D.

3.3.5.1 Large Internet Content Providers

Large Internet Content Providers (ICP), such as Google, Yahoo, IBM, or Microsoft represent the potential high-profile customers. Although, it is probable that this category will be the largest initial customer segment, this segment represents only a small

overall fraction of the total potential customer base. ICP have high volume XML

processing needs and large information technology infrastructure budgets. Customers in

this segment demonstrate a high desire for new high performance XML processing

solutions. They are extremely knowledgeable about related XML processing technologies

and the characteristics of each of the existing options. ICP customers represent the likely

first adopters of high performance XML processing software. If substantial benefits are

demonstrated, then they are willing to make major infrastructure changes. Moreover, ICP

provide the highest level of commitment in terms of time, resources and budget. ICP

demand high performance products and show the least concern for the price of the

products. However, a potential drawback is that customers in this segment are unwilling

to make quick purchasing decisions and usually involve a large number of individuals,

groups, or consultants in the decision. The involvement of additional stakeholders results

in higher sales costs.

3.3.5.2 Software Developers

The most important market segment is the software developers who develop

related XML processing applications. Galdos Systems who develops GML processing

solution belongs to this customer segment. Customers in this segment will not adopt new

technology as quickly as innovators but will certainly adopt a new technology before a

majority of adopters have accepted it. This group is enamoured with the benefits provided

by high tech solutions and utilizes new technology to enhance their products. These

customers demand high performance products with average convenience and are less

concerned by the price of the products if technical benefits are present. This group is able

to make a quick purchase decision. However, the technical features of the product bias

these purchase decisions. They consider themselves technically competent and demand leading edge technology. Even if the related technologies are yet to be proven effective innovations are considered. Products are selected on the presence of advanced features, in spite of the risk.

3.3.5.3 System Integrators

Another important market segment is the system integrators. Galdos Systems who delivers geospatial infrastructure solutions to international businesses and governments is a software developer as well as a system integrator. This group is composed of solution providers and high-tech consultants. Its influence on other segments is significant. This group tends to be opinion leaders and helpful in advertising the new solution to additional potential buyers. Once a solution is proven effective customers in this segment influence their clients/customers to adopt a new technology. These customers demand high performance and user-friendly products and usually are less concerned by the price of the products if a new technology promises potential for innovation. System integrators consistently define/design solutions for their clients, and like to promote a product that has proven benefits. Innovators and early adopters particularly influence this group. They usually consider themselves technically competent and hold high technological expectations. They usually choose a product offering the most effective 'do it yourself' features and are concerned with keeping potential buyers informed and educated. As such, educational offerings are of interest.

3.3.5.4 Large/Medium-Sized Enterprises

Customers in this segment are the large or medium-sized high-tech enterprises such as General Electric, Siemens, Nokia, or Sun Life Financial. These companies use XML processing solutions to support XML traffic on corporate networks and Web services. This segment views the current XML processing solutions as adequate. These companies will consider a new product only if the solution has been proven to be effective but are more likely to purchase improvements to existing solutions. Some customers in this segment seek well-defined and branded products, which they then integrate into their networks. Others need consultancy about how to use and implement these products, in other words, solution providers. These companies are looking for high quality, high-performance and easy-to-use products. They can afford expensive products and often view price as an indication of quality. This segment is usually the largest and represents the bulk of potential customers. Because they perceive more risk in buying new products, they adopt a product innovation only after a large number of customers have tried it. Early majority particularly influence this group. After sales support is expected and usually required. The customers in this segment are not able to make a quick purchase decision and usually involve more individuals, groups, or consultants in the purchase decision. As mentioned, the involvement of additional stakeholders results in higher sales costs.

3.3.5.5 Government/Non-Profit Organizations

Customers in this segment are primarily state-owned companies such as ICBC, BC Hydro, or Bank of Canada. These companies use XML processing solutions to support XML traffic on corporate networks and Web services, but they exhibit little

desire for new XML processing solutions. These customers usually have tight budgets

and tend to react negatively to technically complex solution offerings. This segment is

most likely to be interested in products that are improvements to existing solutions rather

than new technologies. These customers seek well-defined and branded products and

demonstrate serious concerns with the quality and performance of products. The sales

cycle of these customers is relatively long and price sensitive, but once established, this

segment is unlikely to entertain alternatives. In addition, these customers are not able to

make quick purchase decisions and usually involve additional individuals, groups, or

consultants in the purchase decision. They often require extensive user education and

after sales support. This group is considered as the late majority and the very slow

adopters who follow the late majority. It represents only a small percentage of the total

potential customers.

Figure 5 Position of each customer type in the technology adoption lifecycle
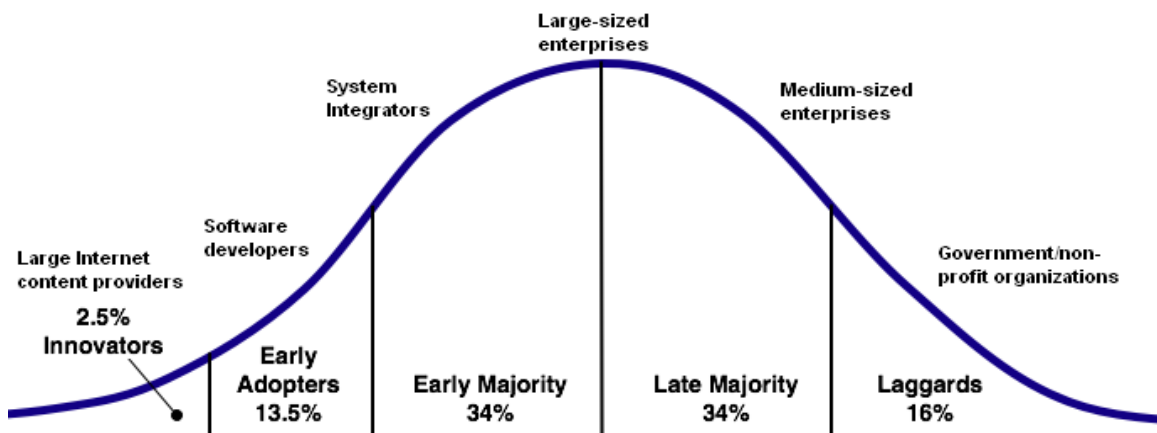
3.4   Proposed Software Based XML Solution

The focus of this product is high performance XSLT processing and aims to boost

XML processing performance for XML processing in industry standard server

environments. This product provides an open standards based C++ based software library for XSLT based XML processing. The decision to offer a C++ based library is based both on programming language capabilities as well as on the performance characteristics of the C++ programming language itself. Technology adopters are required to integrate this library into existing code to leverage the performance benefits in XML transformations. In an XSLT based solution, integration is minimal. This product competes with both hardware and software XML processing solutions.

3.4.1   Sustainable Competitive Advantage

This venture possesses a sustainable competitive advantage through its proprietary technology that enables high XML processing performance.

3.4.1.1 The Patented SIMD Technology

This product is based on the Single Instruction Multiple Data (SIMD) technology available in modern commodity processors. A simple example of how SIMD function is located in Appendix B. Professor Robert Cameron, a stakeholder in this project, has developed high performance XML processing algorithm and implementation techniques based on SIMD. Professor Robert Cameron has patented his SIMD XML data processing technology. This patented SIMD technology supports the proposed XML transformation solution to enable higher XML processing performance and creates a competitive advantage through product differentiation in the XML performance optimization market. In comparing the advantages of our proposed solution over the Intel XML Software Suite software engineer Ken Herdy stated, "This patented SIMD technology differs from Intel's solution in that it combines patented XML processing algorithms together with SIMD

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(Single Instruction Multiple Data) technology to accelerate XML processing as well as multicore software programming techniques to leverage the current and anticipated performance improvements of multicore commodity processors. Intel's solution is multicore specific; it does not even consider SIMD performance benefits".

3.4.2   SWOT Summary

A performance of a SWOT analysis discovered the strengths, weaknesses, opportunities, and threats of this proposed technology. Strengths and weaknesses are generally internal attributes, which this venture can address by changing its business. Opportunities and threats are generally external. Large, well-known competitors participating in this evolving market offer this venture opportunities and threats. This venture needs to build on its strengths and at the same time to minimize its weaknesses.

3.4.2.1 Strengths

1. Proprietary technology. This venture has patented an XML data processing technology using SIMD. This patented SIMD technology supports the proposed XML transformation solution to enable higher XML processing performance over its competitors' offerings.

2. Cutting edge technology. This venture possesses a multicore software programming technique to leverage the current and anticipated performance improvements of multicore commodity processors. These techniques enable software to utilize the additional cores available in multicore processors and run faster in the future as more cores become available.

3. <u>Manageable size</u>. This venture does not have to support a large overhead. It is more flexible and quicker to adapt to changing environmental opportunities and threats than larger organizations.

3.4.2.2 Weaknesses

1. <u>Lack of capital</u>. Without sufficient capital, this venture cannot obtain sufficient research and development staff to complete the proposed R&D project and market the finished product. This venture is short on support for sales and marketing.

2. <u>Newness and smallness</u>. This venture has limited abilities to obtain benefits from economies of scales and to attract qualified employees and managerial talent. This venture also encounters difficulty in raising capital.

3. <u>Newness of the brand</u>. Some prospects perceive most value in an enterprise's brand. This venture is a new entity. Consequently, this product may be perceived as an innovative high-risk option.

4. <u>Marketing</u>. This venture does not have the resources required to do general marketing. This is a major disadvantage in competing with larger organizations.

5. <u>Lack of contacts</u>. This venture is a small entity with few industry partners and contacts. It may encounter difficulty in leveraging word-of-mouth marketing, contacts, and networking. In the early days, this venture will

largely depend on word of mouth first as its main form of generating leads.

3.4.2.3 Opportunities

1. <u>The industry trend of commodity processors</u>. The industry trend of commodity processors from single core to multicore to manycore systems lies with the venture's XML solution that is designed to leverage performance gains in multicore commodity processors.

2. <u>Industry demand for high XML processing performance</u>. As the XML traffic in Internet and corporate information network continues to grow opportunities are obvious.

3. <u>International market growth</u>. The demand of the international market is growing exponentially driven by the proliferation of Internet and network connectivity in developing countries such as China and India. Strong potential markets in China and India are obvious.

4. <u>Participation of large organizations</u>. Intel's aggressive move into software provides an insight into where the market opportunities lie. Early entrants that create highly optimized software based XML solutions have the potential to be acquired by the existing XML solution providers.

3.4.2.4 Threats

1. <u>Participation of large organizations</u>. Large competition is a threat as well as an opportunity. A larger, branded competitor must recognize this

venture's niche and competes with this venture in the same market segment.

2. <u>Change on commodity processors design</u>. This venture's proprietary technology is developed based on the features available in standard commodity processors. The change on commodity processors design will cause significant impact on venture's competitive advantage.

3. <u>Introduction of new/better products by rivals</u>. Chip manufactures may come up with better chipset or technology for hardware appliances to leverage the XML processing performance.

3.5 Competition

3.5.1 Direct Competition

Companies that offer high performance software-based XSLT processing in industry standard server environments represent the direct competition to this product. Early entrants into the software based XML optimization market include companies such as the Intel Corporation. A head-to-head competitor analysis was conducted to discover the strengths and weaknesses of this corporation in comparison to the Intel Corporation.

3.5.1.1 Intel Corporation

Intel, the world's largest semiconductor company, recently announced its' move into the XML software based optimization market with the beta release of Intel XML Software Suite (XSS) in late 2007. In 2008, Intel released version 1.0 of the software suite, consisting of a set of Java and C++ based libraries designed to implement common XML processing functions. Intel developed this Software Suite based on technology

acquired with XML appliance maker Sarvega two years ago (Dornan, 2007). Intel

pursued this technology with an intention to leverage its' expertise in multicore processor

technology. In comparing the advantages of this venture's proposed solution over the

Intel XML Software Suite, this venture's proposed solution utilizes patented high

performance algorithms based on SIMD technology to leverage improved XML

processing performance. A detailed product attribute comparison of can be found in

appendix E.

Intel sells its software suite directly to system engineers who seek to improve the

performance of XML processing bound applications. Intel uses online marketing to

promote and distribute its Software Suite via the Intel website. Intel prices its suite at

$499 USD and offers one year of support services, which includes technical support and

updates at the price of $125 USD.[5] Recently Intel dramatically cut the price of its

Software Suite to $100 USD. Intel's penetration pricing strategy aims to achieve high

market penetration rates for a mass market and at the same time establishes a long-term

price expectation for the software based XML products.

3.5.1.1.1   Intel's Strengths

1. <u>Brand</u>. Intel is a well-known high-tech firm. Prospects perceive Intel as a

   high value brand.

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[5]   Intel Corporation, 2008. Intel XML Software Suite 1.0 2008 Intel Corporation, Retrieved June 13, 2008,
     from http://www.intel.com/cd/software/products/asmo-na/eng/366637.htm

2. Marketing. Intel has sufficient resources to launch marketing campaigns

   for its products and services. This is essential in the relatively new market

   of high performance software based XML processing.

3. Contacts. Intel possesses many high-profile industry partners and contacts.

   Intel leverages high product distribution and word-of-mount marketing.

4. Complementary Products. Intel designed the XSS to leverage the

   architecture of Intel multicore processors. Intel can further explore

   performance gains over its competitors through changes in the design of

   underlying Intel processors.

3.5.1.1.2   Intel's Weaknesses

1. Large Corporation Size. Intel may not be flexible and quick to adapt to

   changes in environmental opportunities and threats.

2. Non-customized Solutions and Services. Intel is a product provider, not a

   customer-oriented organization, which provides customized solutions and

   services.

3.5.2   Indirect Competition

Indirect competitors are those companies, which offer hardware XML

acceleration appliances. Early entrants that provide XML-specific hardware appliances

include vendors such as DataPower Technology, since acquired by IBM, Reactivity,

Inc., since acquired by CISCO, Forum Systems, Sarvega, since acquired by the Intel

Corporation, and Layer 7 Technologies. To satisfy XML handling and security

requirements, these vendors manufacture custom XML hardware appliances, pre-packed

with advanced security features such as data encryption, digital signatures and denial of service attack prevention strategies. The top three hardware appliance companies, DataPower, Forum Systems, and Sarvega offer custom appliances aimed at processing XML traffic quickly, securely and efficiently. Although feature overlap exists, each company targets optimized performance in slightly different feature areas.

3.5.2.1 DataPower Technology

DataPower targets XML processing speed. The company offers hardware appliances for processing XML at wire speed with a goal of optimizing networked application response times. DataPower claims its appliances accelerate XML processing tenfold or more (Bednarzm, 2002).

3.5.2.2 Forum Systems

Forum Systems tackles the problem of XML security. The vendor offers hardware appliances for encrypting and decrypting XML content. Forum claims its appliances can protect systems from XML viruses, data corruption and denial of service attacks while allowing XML data to flow between web services.

3.5.2.3 Sarvega

Sarvega focuses on intelligent routing. This company offers hardware appliances that securely route and prioritize XML traffic. Sarvega's appliances understand specific tags within an XML document and assign priority to specific transactions, such as high priority sales orders.

3.5.2.4 XML Hardware Acceleration Market Shares

The XML hardware appliance market has become competitive due to an increase in number of solutions providers. In 2001, the number of hardware appliance vendors was merely five but by 2007, it had grown to over 15.[6] In addition, the market consolidated through mergers and acquisitions by larger corporations, increasing competition on quality as well as on price. Figure 6 break down the current approximate market share in revenue of hardware appliance companies.

Figure 6 Market share in revenue (Pie) by current market suppliers
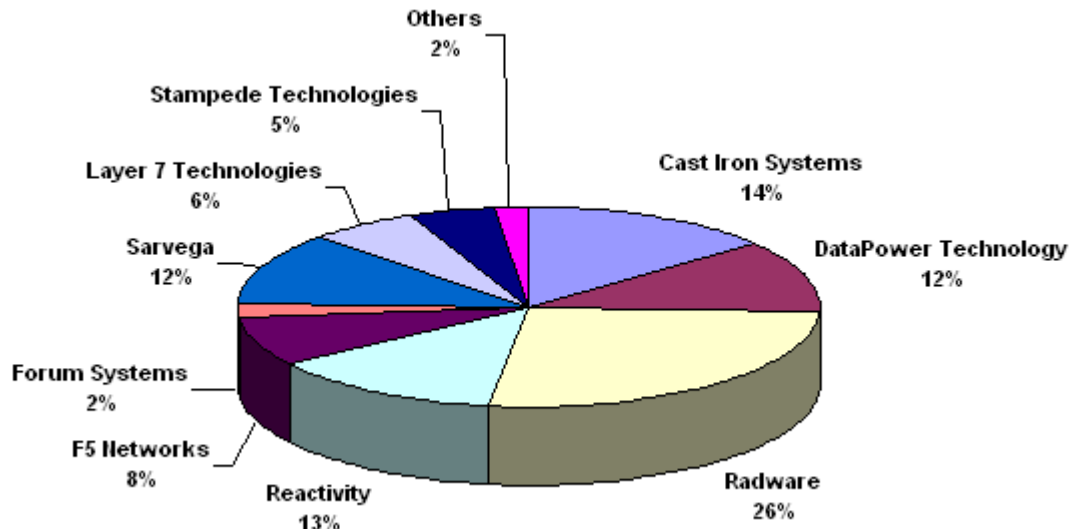
Created by author with data compiled from MINT Global Database.

3.5.3   Positioning Map

Two primary factors are considered in the evaluation of XML processors. Firstly, performance and secondly, cost of ownership. This venture's XML product is positioned

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6   XML appliance, (1999). Wikipedia, Retrieved May 30, 2008, from
    http://en.wikipedia.org/wiki/XML_appliance

on a two-dimensional graph, based on performance and costs factors as shown in Figure 7.

XML hardware appliances on the market range in price from approximately $30,000 to $70,000. Custom XML hardware can increase XML processing speeds from 10 to 20 times when compared with the standard applications executing in industry standard server environments (Stevens, 2004). Software based XML solution range in price from $5000 to $20,000.

Figure 7 Industry product position map
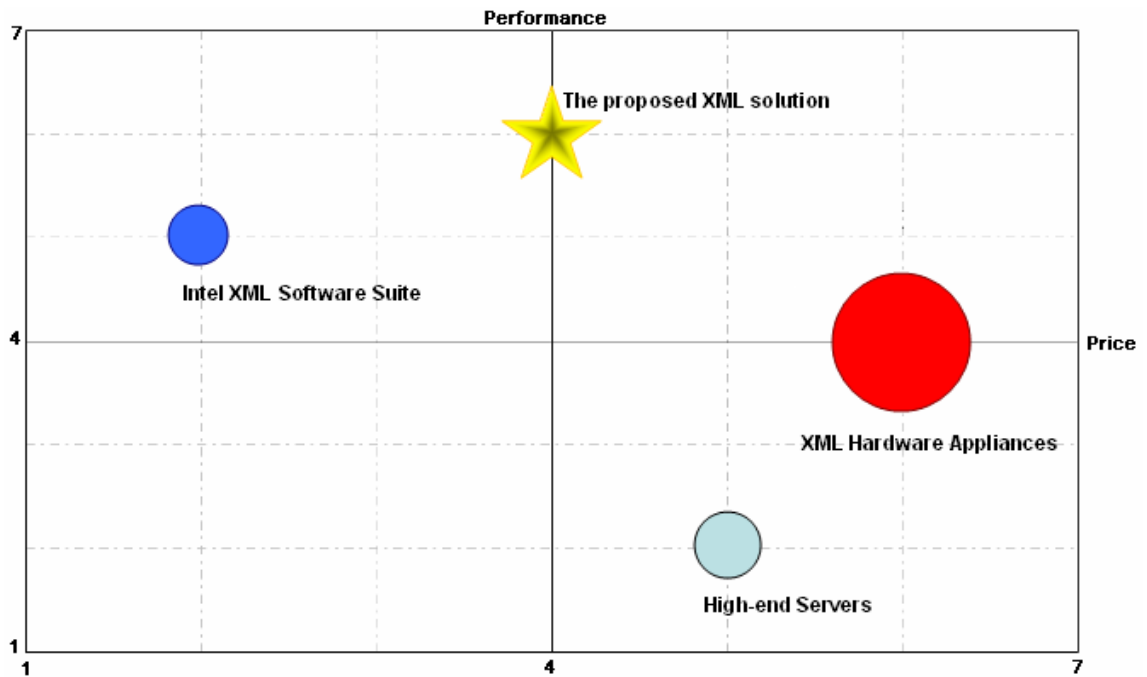
4: BUSINESS STRATEGY

4.1   Value Proposition

This venture provides high performance software based XML processing

solutions to enterprise customers, which significantly improves XML network traffic

processing performance on corporate networks while minimizing integration costs.

4.2   Critical Issues

The following sections identify several critical issues to this venture in marketing

its technology to a relative new market.

4.2.1   Customer Acquisition

Acquiring customers in a relatively new market is the most critical issue for this

venture. Software engineers who develop XML processing applications represent initial

target market segment. A second important target segment is system integrators. System

integrators influence enterprise customers with high XML processing needs to adopt new

high performance XML solutions. This venture needs to create incentives for the

participation of software engineers and system integrators to compete with the Intel

Corporation Inc., this venture's major direct competition. This venture needs to contact

key software developers and system integrators and offer them advice, training, and

promotional incentives to ensure the major channel members remain loyal to the product.

Additionally, this venture needs to promote its product to enterprise customers in order to

stimulate demand. The product demand generated by end user promotion motivates distribution channels.

4.2.2   Technology Diffusion

The rate of product diffusion is critical in that innovators commonly respond to media whereas the early majority responds to word of mouth product endorsement. The so-called "bandwagon effect" must be established to leverage full product adoption potential. To improve product adoption and diffusion, this venture not only needs to utilize value added resellers to provide a 'whole product' solution as means to accelerate product diffusion but also needs to establish collaborative relationship with industrial players to create a single technical standard in the software based XML solutions. First, this venture needs to standardize the external application program interfaces (APIs). In other word, the proposed product must support the open standards such as W3C XML 1.0, W3C Namespaces in XML 1.0, W3C XSLT 1.0 and W3C XPath 1.0, which are necessary for any standards compliant XSLT processors. This venture should also claim conformance to the test suites developed by OASIS as this would be a natural step in the development of any standards compliant XSLT processor. Then this venture produces a reference implementation with components that have defined but not mandatory internal interfaces. The firm should not dictate how the standard APIs are actually implemented, but should offer the option of building plug-ins that can replace components of the reference implementation, so that developers can give choices. This venture also needs to provide standard-compliant developers full support to integrate the proposed product into their XML applications.

4.2.3 Complementary Assets

Complementary assets, such as channel relationships or a well-known brand, are critical to the venture's success and expensive to reproduce. Product development costs in the establishment of a brand name, distribution channels, customer relationships, manufacturing capabilities, sales and service expertise, and value-added partnerships present a significant challenge to this venture. In the commercialization of the technology, this venture can compete with incumbents through the product market or it can cooperate with established businesses by selling their technologies. In the second case, this venture can for example, license its technology to a larger company, form a strategic alliance, or agree to be acquired outright. As a startup, due to lack of complementary assets this venture is significantly more likely to choose a cooperative strategy to reduce competition and risk. The business model section presents various strategies that can leverage this venture's complementary resources.

4.3 Business Model

When pursuing a cooperative strategy, this venture needs not only to establish strategic relationships with key partners to gain access to the complementary assets necessary in the establishment of an economically viable business, but also needs to build complementary relationships with competitors. As described below, several collaboration alternatives offer business opportunities while at the same time serve to reduce business risks.

4.3.1   Open Source Model

Due to a lack of research and development capital, this venture proposes the use of an open source development strategy as alternative to a proprietary development model. The factors outlined in the following sections influence the decision as to whether this business could benefit from the investment of intellectual property to the open source community.

4.3.1.1 Advantages

A primary advantage of an open source development strategy is an accelerated rate of product development attributable to a large and diverse talent pool working on a common product code base. This increased rate of innovation comes cheap. A secondary benefit is the potential development of a large and diverse number of new applications and products reflecting the interests of the open-source development group community. In addition, benefits are realized in the form of reduced research and development costs and free redistribution.

4.3.1.2 Disadvantages

A potential disadvantage of an open source development strategy is the risk of the introduction of poor quality of code into the final product (Polley, 2007). A core group of developers is required to manage product development. Under the open source development scheme, it is common that this core group is a group of paid developers. Clearly, the introduction of poor quality code is not acceptable in the case of a high performance XML processing solution.

Similar risks exist in that externally developed code may originate from proprietary sources and provide no guarantee that the source code does not infringe on third party intellectual property rights (Polley, 2007). Consequently, this venture must remain aware of the risk of indemnification as well as the potential of patent violation though an active involvement in project management.

4.3.1.3 Challenges of Open Source Strategy

An open source development strategy offers the advantages of rapid development, through a large pool of developers at low cost together with the potential to gain market share through wide spread adoption of open source code and despite well-established competition. The dilemma of how to develop this product as an open source product and still profit after the initial release presents the following challenges.

1. <u>Attraction of open source development talent</u>. An open source strategy provides no guarantee of the acquisition of sufficient development talent (Kassas, 2007). This technology must be advertised to the open source community. Further, the product must be a desirable technology for open source developers to work on without pay and to remain committed throughout the project duration. This venture not only needs to promote its open source project but also needs to create sufficient product document and incentives to allow open-source developers to participate. Incentives may include notoriety in the open source development community, experience working with leading edge technologies, and free source code for commercial use.

2. Barriers to the adoption of open source software by enterprises. Barriers include the perception that open source licenses are viral, lack of formal support and training, the velocity of change, and a lack of a long term roadmap. The majority of these barriers are risk-related.[7]

3. Adoption of a 'services only' business model. Many business models exist around open source software to provide a 'whole product' in order to mitigate risk. The 'whole product' paradigm typically includes support, commercial licenses, professional services, training, certification, partner programs, references and use cases.[8] This venture could profit from the offering of professional services, or training, or integration/product support services at cost. However, the core competencies of this venture are not the provision of professional services or supports. This would require significant additional resources before the realization of any profits.

Based on the challenges presented an open source strategy is not a viable option. Of primary importance, after the initial release of this technology, this proprietary technology will lose commercial value. At that point, paid support and documentation would become the main source of revenue. This venture would lose its competitive advantages and become less attractive for potential acquirers.

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[7] Open source, (1999). Wikipedia, Retrieved July 2, 2008, from http://en.wikipedia.org/wiki/Open_source

[8] eXtropia, what is the open source business model?, Retrieved July 17, 2008, from http://www.extropia.com/tutorials/misc/opensourcebiz.html

Intellectual property is the core asset of any technology-based company. Clearly, intellectual property is a critical asset to this venture. A proprietary development model is highly recommended in this case because it can leverage the competitive advantages and core competencies of this venture.

4.3.2   Venture Capital Financing

To provide this venture with sufficient cash flow to execute its growth strategy, a viable option is venture capital (VC) financing. Most venture capital investments prefer businesses with a sustainable competitive advantage, such as proprietary technology, which large corporations would subsequently be willing to buy. This venture's proprietary technology lies with this opportunity. Appendix F presents a list of venture capital investment activities in early XML appliance market.

Through seed-capital financing, this venture can raise required capital to support its research and development effort, turning the innovations into commercial products. In addition, with the involvement of venture capitalists, this venture's weaknesses can be minimized because venture capitalists possess a large network of contacts which can help this venture succeed and can provide assistance in the recruitment additional members to the management team.

Venture capital investment can provide the sufficient cash to fund the strategic plan, develop the business, and develop a significant profile in the industry. This industry profile in turn allows this venture to become more attractive to potential acquirers. Some

examples of VC funded appliance startups acquired by large corporations are DataPower, Reactivity and Sarvega. Table 2 presents the details of the terms of these acquisitions.

Table 2 Terms of acquisitions of XML hardware appliance startups

Appliance Startups	Amount (US$)	Acquirers	Date
Reactivity, Inc.	$135 million	Cisco	Feb 2007
DataPower Technology	$100 million	IBM	Oct 2005
Sarvega	Undisclosed	Intel	Aug 2005

Created by author with data compiled from MINT Global Database

4.3.3   Intel Capital

To be successful in a complex, rapidly changing and highly competitive market, this venture must consider the effect of competition in its core business model. To mitigate the effect of direct competition, this venture would benefit by the establishment of a collaborative relationship with Intel. Collaboration with Intel would involve joint technology and marketing development. Intel is on the forefront of software based XML processing solutions and is dedicated to invest in this industry. On January 2004, Intel Capital injected a capital investment into Sarvega, an Illinois-based developer of XML appliance technology. On August 2005, the Intel Corporation acquired Sarvega.

The Intel Capital website indicates that since 1991, Intel Capital has invested more than $7.5 billion USD in approximately 1,000 companies. Intel Capital prefers proprietary technology businesses that are able to leverage Intel's core technologies. This venture's technology is specifically designed to leverage performance gains in Intel's

multicore commodity processors and therein lies with this opportunity. The establishment of a strategic alliance with Intel is critical for the following reasons.

1. <u>Maintain core competency</u>. This venture's core competency is to conduct research and development, and not to perform manufacturing and marketing. The creation of strategic partnerships with Intel allows this venture to focus on its core competencies.

2. <u>Leverage complementary resources</u>. With intellectual property protection, this venture can earn the highest returns by licensing its technology directly to Intel. At the same time, Intel can leverage this venture's complementary assets.

4.4   Strategy Pyramids

As indicated by the previous target market strategy, this venture must seek new venture capital financing to fund the numerous activities which are required to support the growth of the business. The following tactics and business activities are essential in the achievement of this goal.

1. <u>Develop a business case</u>. In order to afford venture capitalists the opportunity to make a sound investment decision this venture will need to provide relevant and accurate business case and product information. Such an analysis will identify specific user needs, problems and opportunities. In addition, this venture must provide compelling scientific evidence to validate the concept of this innovation. In other word, this venture must be able to demonstrate that this proprietary technology provides significant

increases in XML processing performance over and above existing solutions.

2. <u>Consult with venture capitalists</u>. To seek investment funds, this venture can contact the Vancouver based venture capital firms of BDC's Technology Seed Investment Group and GrowthWorks Canadian Fund Ltd. These firms are familiar with the XML processing industry and are able to provide valuable business advices. These firms provided $4 million USD in a seed round of funding to Layer 7 Technologies, a Vancouver based supplier of XML appliances. A list of venture capital firms that have invested in XML startups is presented in Appendix G.

3. <u>Recruit management talent</u>. This venture must provide incentives to attract and retain management talent. The incentives include but are not limited to, competitive salary, benefits, compensation, and employee stock options for key employees. A talented management team will provide this venture with extensive experience in a specific market segment as well as strong relationships with distribution channels and has the ability to execute on projections.

5: MARKETING MIX

The following sections identify the sales strategy of this venture in the context of XML performance optimization market.

5.1 Positioning Statement

For software developers who develop high performance XML solutions for enterprise customers, this proposed product is a high performance XML processor which supports software developers in the development of high performance XML solutions. Unlike Intel's XML solutions, this proposed product utilizes patented SIMD technology to accelerate XML processing and delivers substantial performance advantages.

5.2 Product Marketing

The performance qualities of this product are a key component in this marketing mix. In a competitive market, high XML processing performance capabilities are clearly this venture's best feature. Word of mouth marketing together with the utilization of value added resellers provide a 'whole product' solution. This approach is deemed as necessary to achieve a dominate position in the early majority segment. Whole product solutions typically include product support, commercial licenses, professional services, training, certification, partner programs, references and use cases.

5.3   Packaging

This venture does not need to offer a physical distribution of this product. Instead, this venture should provide an electronic version for download. Initial product releases will support either C/C++ for the Windows proprietary operating system or C/C++ for the Linux open source operating system. This venture must include a comprehensive technical reference describing the product itself, the product use and a migration strategy from current software in the commercial distribution.

This venture can offer either the product and support services, which include technical support and product version updates for an annual subscription fees separately, or a combination of the product and support services as a bundle. The bundled package provides an additional benefit that is valued proportionately more in this venture's target segment.

5.4   Pricing

This venture targets a price insensitive target market and should use a skimming pricing strategy to introduce the product into the marketplace. A high price will be charged to those early adopters, which demonstrate a willingness to purchase innovative products. Such buyers typically are prepared to pay a premium price for new products, which exhibit high performance.

Although Intel's penetration pricing strategy aims to achieve a large market share quickly, the strategy of this venture is to compete on performance and not price. Higher

performance justifies a higher price. In addition, this venture can charge an ongoing subscription fee for support and services or combine its product with support services as a bundle. This bundle pricing strategy serves to make competitive comparisons more difficult.

5.5   Promotion

This strategy considers software developers responsible for the development of XML applications as innovators. This venture should use advertising and public relations, usually called pull tactics, to stimulate customer demand and create large-scale awareness among software developers who are motivated to buy after seeing an ad or reading an article. To communicate products or services potential to software developers this venture should consider the following promotional activities as outlined in the following subsections

5.5.1   E-Marketing

This venture should launch a company website to promote the corporate image and provide up to date information for its products and services. The company website is the most important media from which most prospects get the venture's product information. This website not only lists the proposed product's features, but also describes its benefits to customers. To accomplish its online marketing effort, this venture can advertise with online advertising firms such as Yahoo!, MSN, and Google. Advertising with online advertising firms enables most prospects to reach this venture's website when they search for a related product or service online. In addition, this venture can utilize partner website to promote its products and services. Joint marketing strategy

enables this venture to promote its product or service to enterprise customers and stimulate demand. Consequently, product demand generated by end customer promotion motivates distribution channels. The e-marketing promotion should begin with the launch of the initial website.

5.5.2   Magazines

To reach a network of software developers this venture should advertise in magazines that target XML and XML related applications. This venture advertises in magazines to entice XML application developers and solution providers. This venture can use magazine based advertising to create awareness for an upcoming event, a new feature, a new product or service that this venture provides. Additionally, it also enables this venture to create large-scale awareness and to position its product and can create many sales leads. In advertisements, this venture should use highly visual symbols to catch attention and stimulate demand by creating a perception of a felt deprivation or need among customers (Dhalla, 2005). For example, this venture can emphasize the performance gains of its product over the offerings of its competitors'. Magazine based advertising should commence at the time the of product launch.

5.5.3   Public Relations

To increase visibility, this venture should participate in press releases and conferences, and publish editorials with major publish materials that cover XML solutions. This venture should use press release to inform and educate early adopters about its new products. This press release will identify the proposed product's positioning, its price, its packaging, its target customers and the place where it will be

sold. It also describes the product attributes in customer terms and major feature of the product. This venture should finish a press release about a month before the product launch. Additionally, to create a public presence, this venture should sponsor events for the community of XML application developers and solution providers. The main goal of public relations is to change attitudes towards this venture and its products.

5.6　Web Plan

This venture is going to sell and market the proposed product via the Internet. The product website will provide technical details about the product and services, and support online sales. This information will allow XML application developers to make feature comparisons and facilitate purchasing decisions. To demonstrate this venture's expertise, the website will include a technical resources area, offering articles, research and regular newsletters to interested participants. Future development will be based on available resources and business requirements.

5.6.1　Website Goals

The product website has three specific goals.

1. To generate potential customer leads.

2. To facilitate online product purchase and distribution.

3. To provide post sales services such as product support services.

5.6.2　Development Requirements

This venture's product website either may be developed internally, or may be contracted out to web designer to develop a simple, elegant, content-rich site. This

venture should also examine pre-packaged solutions such as those provided by website hosting service providers. A simple web hosting service provider such as Yahoo! Web services or the equivalent will suffice as a hosting service. This venture must perform the maintenance of the website and content.

5.7   Distribution

The largest customer segment will be the highest priority and receive direct personal selling. A direct marketing operation will handles midsized accounts via telephone sales. This venture's sales representatives must call upon large and mid-sized system integrators and solution providers in the distribution chain and offer them advice, training and promotional incentives to make sure the channel members remain loyal to the product. Advertising will be used for all the generation of all prospective customer leads. The company website will serve to support small accounts. Further details regarding package selection and costs will be available through the website.

This venture must market and sell optimized XML processing solutions to large and medium-size enterprises through the value added resellers (VARs) which include system integrators, solution providers and high-tech consultants. Channel partners such as solution providers and system integrators enhance new product adoption and diffusion by providing a 'whole product' solution to enterprise customers. Figure 8 illustrates a hybrid marketing system for prospective customers, indicating all tasks and channels.

Figure 8 Hybrid marketing system for this venture's prospective customers.

Marketing Channels	Demand-Generation Tasks				
	Lead Generation	Qualifying Sales	Close of Sale	Post sales Service	Account Management
Direct Sales	Large XML application developers				
Telemarketing	Midsize XML application developers				
Advertising	All				
Internet	All XML solution providers				
XML Solution Providers	System integrators and large size enterprises				
Systems Integrators	Large and mid size enterprises				

5.8 Sales Plan

5.8.1 Sales Tactics

This venture's entrance strategy relies on the formation of partnerships with large and medium-sized XML solution providers and system integrators. The direct sales team can achieve this through the hiring of key personnel, which possess industry connections. The direct sales team requires two different types of personnel industry connections, XML solution providers links and system integrators contacts. This venture must offer a commission as well as a base salary to experience personnel to encourage the effort of the sales team.

This venture's target end user is likely to purchase whole product solutions from existing distribution channels, which are capable of providing value added support based on pre-existing distribution channel relationships. However, distribution channels are reluctant to support products for which there exists no customer demand, even under the offer of tremendous incentives, simply because they do not want to waste valuable

resources without a guarantee of success. Distribution channels must be motivated by the promotional efforts of this venture to support the product and to generate product demand. Consequently, this venture deems end customer promotion to generate sufficient product demand as a requirement. Generated demand via product promotions supports the motivations of distribution channels to distribute the product.

5.8.2   Sales Process

Two primary factors are considered in the evaluation of sales process. Firstly, the responsibilities of the distribution channel must be considered, and secondly the collaborative relationships of the distribution channels must be developed. Solution providers and system integrators are critical to the product adoption process. Figure 9 demonstrates the value chain model for the sales process.

Figure 9 The value chain model for the sales process.
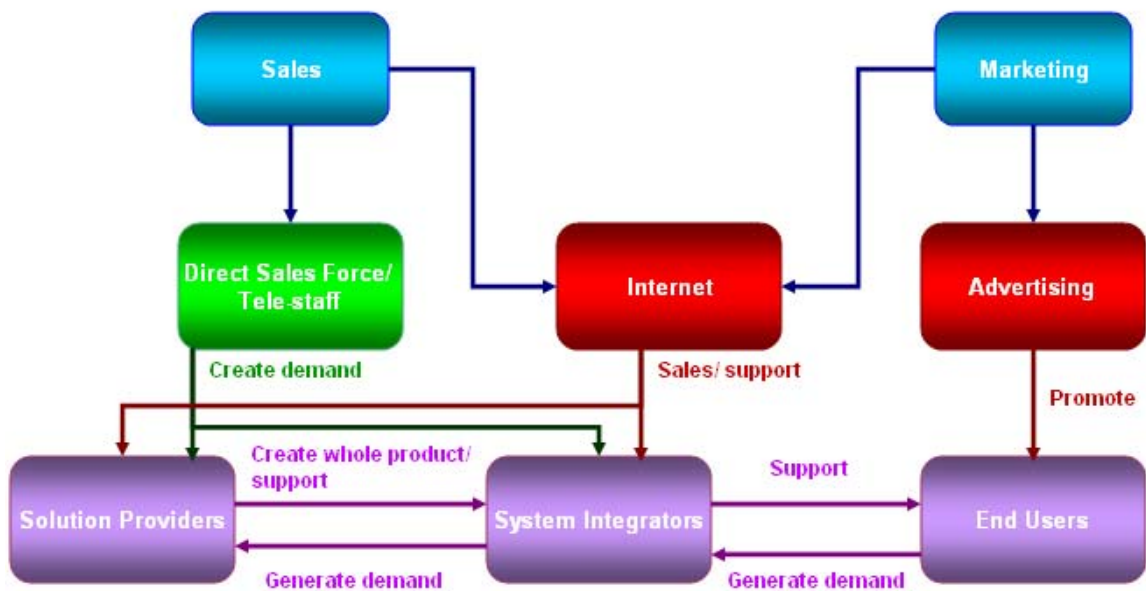
6: CONCLUSION

The XML performance optimization market is evolving into a multi-billion industry. The demand for the high performance XML processing solutions continues to increase as the volume of XML network traffic continues to grow. This venture's proprietary technology that leverages improved XML processing performance lies with this opportunity. Due to a lack of research and development capital, this venture seeks the use of an open source development strategy. However, based on the challenges presented an open source strategy is not a viable option. Most business models exist around open source software to provide service and support, but the core competencies of this venture are not the provision of professional services or supports. This would require significant additional resources before the realization of any profits. Most importantly, intellectual property is a critical asset to this venture. Therefore, a proprietary development model is highly recommended in this case because it can leverage the competitive advantages and core competencies of this venture.

To provide this venture with sufficient cash flow to execute its growth strategy, this venture should contact venture capital firms that have invested in XML startups. These firms are familiar with the XML processing industry and are able to provide valuable business advices. This venture should also consider the establishment of a collaborative relationship with Intel to mitigate the effect of direct competition. This

approach allows this venture to earn the highest returns by licensing its technology while at the same time to maintain its core competency.

When competing with incumbents through the product market, this venture must establish partnership with key value added resellers. These value added resellers help this venture to provide a 'whole product' solution to enterprise customers and leverage this venture's complementary resources. This venture can achieve this through the hiring of key personnel, which possess industry connections. Additionally, the performance qualities of this product are a key component in this marketing mix. Those are important factors that enable this venture to achieve a dominate position in the early majority segment.

APPENDICES

Appendix A XSLT: A simple example


```
<BOOK>
    <AUTHOR>Tom Wolfe</.AUTHOR>
    <TITLE>The Right Stuff</TITLE>
    <PRICE>$6.00</PRICE>
</BOOK>
                                    XML input file
```

XSL PROCESSOR

```
<xsl:stylesheet>
    <xsl:template match="TITLE">
        <H1>
            <xsl:apply-templates/>
        </H1>
    </xsl:template>
    <xsl:template match="AUTHOR"/>
    <xsl:template match="PRICE"/>
</ xsl:stylesheet >
                                    XSL style sheet
```

```
<H1>
    The Right Stuff
</H1>
                        HTML output file
```
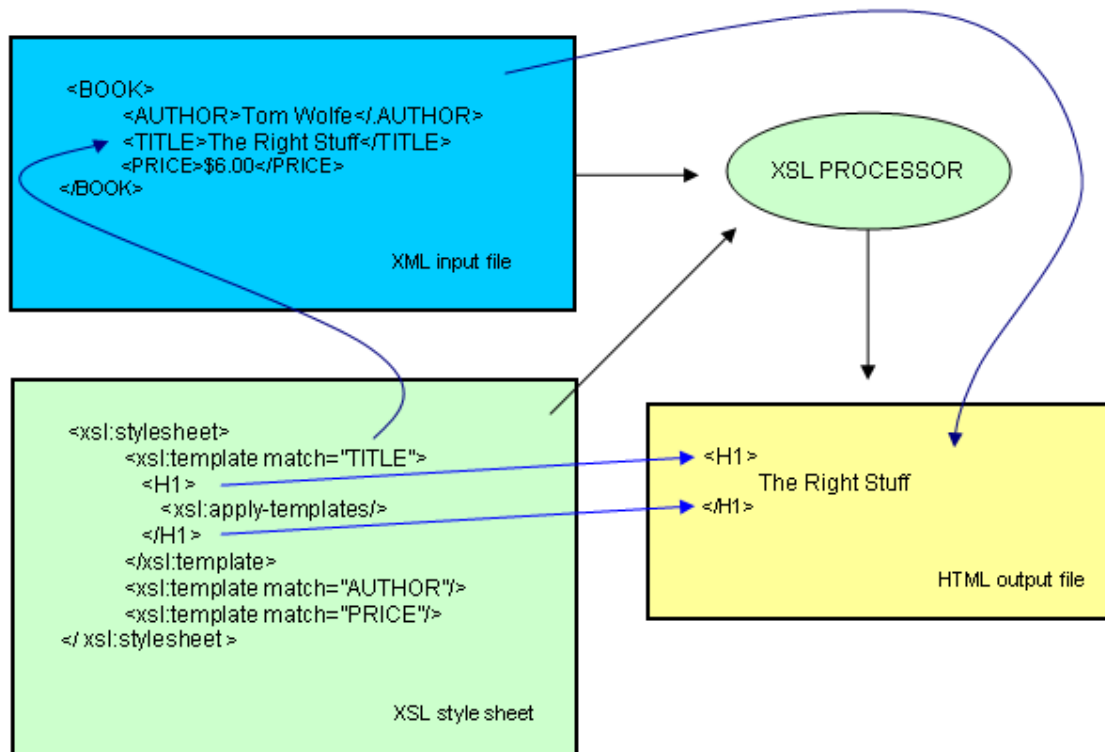
Created by the author based on Figure 2 from ibm.com (Colan, 2001).

Appendix B SIMD: How it works

A simple way to think of how SIMD works is as follows. During each CPU cycle, a CPU completes some unit of work. For example, add four 32 bit numbers A, B, C, D to four other 32 bit numbers E,F,G,H and store the results. That is, A+E, B+F, C+G, D+H. In the SIMD program, multiple units of works performed during each CPU cycle to obtain an overall speed up. The SIMD program leverages data parallelism.

```
---------------------------------
Non-SIMD Operation (Program A)
---------------------------------

Count   Operation

1       Load A into a 32 bit register.
2       Load E into a 32 bit register.
3       Add A to E.
4       Store the result.
5       Load B into a 32 bit register.
6       Load F into a 32 bit register.
7       Add B to F.
8       Store the result.
9       Load C into a 32 bit register.
10      Load G into a 32 bit register.
11      Add C to G.
12      Store the result.
13      Load D into a 32 bit register.
14      Load H into a 32 bit register.
15      Add D to H.
16      Store the result.
```

The total operations count is 16 operations.

```
----------------
SIMD Operation (Program B)
----------------

Count   Operation

1       Load A, B, C, D into a 128 bit register.
2       Load E, F, G, H into a 128 bit register.
3       Add the first register to the second register.
4       Store the results.
```

The total operation count is 4 operations.

Program B is logically 4 times faster than Program A.

Appendix C Bass Model Construction

The below table shows the numerical values of cumulative adopters at time t, N(t), and new adopters, S(t), for software based XML solutions. With the estimates of the coefficient of innovation, p and the coefficient of imitation, q, a forecast for the demand of software based XML solutions over time was constructed.

$N(t) = S(t) + N(t-1)$ = number of cumulative adopters at time t
$S(t) = [p + (q/m)N(t-1)][m-N(t-1)]$ = number of new adopters during time t

Where

Market Size (m) = 50
Coefficient of innovator (p) for personal computers = 0.121
Coefficient of imitators (q) for personal computers = 0.281

T (Years)	N(t)	S(t)	N(t)/m	S(t)/m
1	6.050	6.050	12.10%	12.10%
2	12.862	6.812	25.72%	13.62%
3	20.040	7.178	40.08%	14.36%
4	27.040	6.999	54.08%	14.00%
5	33.307	6.267	66.61%	12.53%
6	38.452	5.145	76.90%	10.29%
7	42.345	3.893	84.69%	7.79%
8	45.093	2.748	90.19%	5.50%
9	46.930	1.837	93.86%	3.67%
10	48.111	1.181	96.22%	2.36%
11	48.850	0.739	97.70%	1.48%
12	49.305	0.455	98.61%	0.91%
13	49.582	0.277	99.16%	0.55%
14	49.749	0.167	99.50%	0.33%
15	49.849	0.101	99.70%	0.20%
16	49.910	0.060	99.82%	0.12%
17	49.946	0.036	99.89%	0.07%
18	49.968	0.022	99.94%	0.04%
19	49.981	0.013	99.96%	0.03%
20	49.988	0.008	99.98%	0.02%
21	49.993	0.005	99.99%	0.01%
22	49.996	0.003	99.99%	0.01%
23	49.998	0.002	100.00%	0.00%
24	49.999	0.001	100.00%	0.00%
25	49.999	0.001	100.00%	0.00%

Appendix D Purchase decision influencers of each segment

	Large content providers	Software developers	System integrators	Large/ medium-sized enterprises	Government/ non-profit organization
Product Life cycle/ Product Adoption Stage	Introduction stage Innovators	Growth stage Early adaptors	Growth stage Early majority	Growth & Mature stage Early majority/ Late majority	Decline Stage Laggards
Usage characteristics (how much, when, for what purpose)	Have high volume XML processing needs	Integrate the solution into their products	Define /design solutions for their clients	Support XML traffic on corporate networks	Support XML traffic on corporate networks
Key Benefits Sought	Improve XML traffic on Web services	Utilizes new technology to enhance their products	Provide better solution to their clients	Improve XML traffic on corporate networks and/or Web services	Improve XML traffic on corporate networks and/or Web services
Purchase Motivations	Have a high desire and interest for new XML processing solution	Enamor with the benefits provided by high tech solutions	Like to promote a product that has proven benefits	Consider new product but only if related solution has been proven to be effective	Interested in products that are improvements to existing solutions rather than something new
Adoption Issues	None Willing to make change (even major change) if the benefit can be shown	Adopt new products even if the related technology has not yet been proven to be effective	Influenced by innovators and early adopters	Influenced by system integrators	Influenced by system integrators
Financial strength	Large budgets	Small budgets	Small budgets	Large budgets	Tight budgets
Information Search (what, where, when, how, how much)	Internet Site E-Marketing Technical content of the offering	Internet Site E-Marketing Magazines Technical content of the offering	Internet Site E-Marketing Magazines Educational offerings	Solution providers / hi-tech consultant Promotional materials	Solution providers / hi-tech consultant Promotional materials
Preference for channel of distribution	Direct sales	Internet and direct sales	Value added resellers	System integrators	System integrators
Attitude toward price versus value	**Insensitive** Demand high performance products, but less concerned by the price of the products	**Insensitive** Demand high performance products with average convenience and less concerned by the price of the products	**Insensitive** Demand high performance and user-friendly products and usually less concerned by the price of the products	**Sensitive** Can afford expensive products and often view price as an indication of quality	**Sensitive** Concerned with the quality and performance of products but are quite price-sensitive

Brand awareness	Low Willing to try new technology or solutions	Low Choose a product offering the most hi-tech features	Medium Willing to try new products but sometime prefer branded product	High Seek well-define and branded products	High Seek well-define and branded products
Commitment required	High Require high level of commitment in terms of time, resources or money	High Require development effort to integrate the offering	Medium Require effort to keep potential buyers informed and educated	Medium Some customers integrate the products themselves, but some seek consultancy	Low Need consultancy about how to use and implement these products
Ability to use the offering	High Extremely knowledgeable about related XML processing technology	High Technically competent	High Technically competent and very effective use of proven technology	Low Require user education	Low Often require extensive user education
After sale support expectations	Medium Require technical support	Medium Require technical support	Low Usually interested in educational offerings	High Require support from system integrators	High Require support from system integrators
Ability to make a quick purchase decision	No	Yes	Yes	No	No
Number of decision makers	Large Involve more individuals, groups, or consultants in the purchase decision	Small	Medium	Large Involve more individuals, groups, or consultants in the purchase decision	Large Involve more individuals, groups, or consultants in the purchase decision.

Created by author with data compiled from interviews with Dr. Cameron, Mr. Herdy and Galdos System Inc., 2008

Appendix E Product Comparison

Requirements	Product attributes	This Venture	Intel corporation
Basic		Patented SIMD Technology	Intel® XML Accelerator Core Technology
	Multi-core support	Yes	Yes
	32 and 64 bit processor support	Yes	Yes
	C/C++ API support	Yes	Yes
	JAXP API support	Not Yet	Yes
	Large-size XML file processing	Yes	Yes
	XSLT accelerator	Yes	Yes
Performance	**Processing speed**	At least a factor of two or better vs. open source XML libraries with a potential for additional performance increases	A factor of two or better vs. open-source XML libraries
Exciters	**Parsing accelerator**	Yes	Yes
	XPath accelerator	Yes	Yes
	Schema accelerator	Yes	Yes
	C/C++ on Linux OS	Yes	Yes
	C/C++ on Windows OS	Yes	Yes

Created by author with data compiled from interviews with Mr. Kenneth S. Herdy, 2008.

Appendix F Venture Capital Investment Activities in Early XML Appliance Market

Venture Capital Deals			
Date	**Company**	**Financing Arrangment**	**Rationale**
Jul 2002	DataPower Technology	9.5 million USD received in second round of funding. Venrock Associates, Mobius Venture Capital and Seed Capital Partners provided the investment.	The investment will be used for further product development and sales and marketing activities.
Feb 2005	DataPower Technology	10 million USD received in a round of funding. Atlas Venture led the investment with participation from Mobius Venture Capital, Seed Capital Partners and Venrock Associates.	The investment will be used for sales, marketing activities, and potential company expansion.
Aug 2003	Reactivity Inc..	USD 10.3 million received in a round of funding. Accel Partners, Austin Ventures, Diamondhead Ventures and JK&B Capital provided the investment.	The investment will be used for sales and marketing activities and to expand operations.
Sep 2003	Forum Systems	17.5 million USD secured in second round funding. GMG Capital Partners led the investment, which was joined by CMS Companies and the Navigator Fund.	
2003 – 2004	Layer 7 Technologies	3 million USD received in a round of funding. GrowthWorks, through the Working Opportunity Fund, and BDC Venture Capital, provided the investment. Further 1 million USD secured to close this round at USD 4 million. Shoreline Ventures provided the additional funding in 2004's.	The investment will be used for product development.
Oct 2006	Layer 7 Technologies	8.9 million USD received in the second round of funding, with BDC Venture Capital, the Working Opportunity Fund and Shoreline Venture Management.	Proceeds will be used for expansion purposes.
Nov 2001	Sarvega	10 million USD received in first round of funding. Bessemer Venture Partners, KB Partners, and ComVentures provided the investment.	The investment will be used for continued growth and the launch of Sarvega's XML switches next year.
Jun 2003	Sarvega	10 million received in a second round of funding. InterWest Partners and previous investors Bessemer Venture Partners, ComVentures and KB Partners provided the investment.	The investment will be used for further sales and marketing activities.

Created by author with data compiled from Zephyr database, 2008.

Appendix G Venture Capital Firms that have Invested in XML Start-ups

Name	Address	Contacts
Accel Venture Partners	428 UNIVERSITY AVE 94301 PALO ALTO California UNITED STATES OF AMERICA	Tel: +1 650 614 4800 Fax: +1 650 614 4880 http://www.accel.com
Atlas Ventures	55 Grosvenor Street London W1K 3BW LONDON UNITED KINGDOM	Tel: +44 207 5294444 Fax: +44 (0)20 7529 4455 london@atlasventure.com http://www.atlasventure.com Fred Destin
Austin Capital	300 W SIXTH ST STE 2300 78701 AUSTIN Texas UNITED STATES OF AMERICA	Tel: +1 512 485 1900 http://www.ausven.com
BDC's Technology Seed Investment Group	Montreal Quebec CANADA	http://www.bdc.ca
Bessemer Ventures	83 WALNUT ST 02481 WELLESLEY Massachusetts UNITED STATES OF AMERICA	Tel: +1 781 237 6050 Fax: +1 781 237 7576 http://www.bvp.com
Blueprint Ventures LLC	601 GATEWAY BLVD STE 1140 94080 SOUTH SAN FRANCISCO California UNITED STATES OF AMERICA	Tel: +1 415 901 4021 Fax: (415) 901-4035 http://www.blueprintventures.com
Communication Ventures LP	305 LYTTON AVE 94301 PALO ALTO California UNITED STATES OF AMERICA	Tel: +1 650 325 9600 Fax: +1 650 325 9608 info@comventures.com http://www.comven.com
Diamondhead Ventures	2460 Sand Hill Road, Suite 301 Menlo Park 94025 California UNITED STATES OF AMERICA	Tel: +1 650 233 7526 Fax: +1 650 233 7527 http://www.dhven.com Raman Khanna (Managing Director) David Lane (Managing Director)
GMS Capital Partners	399 Park Avenue 36th Floor 10022 New York New York UNITED STATES OF AMERICA	Tel: 001-212-832-4013 Fax: 001-212-980-1695 info@gmgpartners.net http://www.gmgpartners.net
GrowthWorks Canadian Fund Ltd	1055 WEST GEORGIA ST SUITE 2600 V6E 3R5 VANCOUVER British Columbia CANADA	Tel: +1 604 633 1418 Fax: +1 604 669 7605 http://www.growthworks.ca David Levi
Intel Capital Corporation	2200, Mission College Boulevard 95052 SANTA CLARA California UNITED STATES OF AMERICA	Tel: +1 408 765 8080 Fax: +1 408 765 9904 E-mail: intelcapital@intel.com http://www.intel.com
InterWest Partners	2710 SAND HILL RD FL 2 94025 MENLO PARK California UNITED STATES OF AMERICA	Tel: +1 650 854 8585 Fax: +1 650 854 4706 info@interwest.com http://www.interwest.com

JK&B capital	180 N STETSON AVE FL 34 60601 CHICAGO Illinois UNITED STATES OF AMERICA	Tel: +1 312 946 1200 Fax: +1 312 946 1112 info@jkbcapital.com http://www.jkbcapital.com
KB Partners	1101 SKOKIE BLVD STE 260 60062 NORTHBROOK Illinois UNITED STATES OF AMERICA	Tel: +1 847 714 0444 Fax: +1 847 714 0445 http://www.kbpartners.com
Mobius Ventures	3000 EL CAMINO REAL 94306 PALO ALTO California UNITED STATES OF AMERICA	Tel: +1 650 319 2700 info@mobiusvc.com http://www.mobiusventurecapital.com
Navigator Technology Ventures LLC	4 CAMBRIDGE CTR 02142 CAMBRIDGE Massachusetts UNITED STATES OF AMERICA	Tel: +1 617 494 0111 Fax: 001-617-225-2080 info@ntven.com http://www.ntven.com
Seed Capital Partners	1 HSBC CTR STE 3850 14203 BUFFALO New York UNITED STATES OF AMERICA	Tel: +1 716 845 7520 Fax: +1 716 845 7539 http://www.seedco.com
Shoreline Ventures Management	471 EMERSON ST STE 201 94301 PALO ALTO California UNITED STATES OF AMERICA	Tel: +1 650 854 6685 Fax: +1 650 326 8005 info@shorelineventures.com http://www.shorelineventures.com
Venrock Partners	30 ROCKEFELLER PLZ 10112 NEW YORK New York UNITED STATES OF AMERICA	Tel: +1 212 649 5600 Fax: +1 212 649 5788 http://www.venrock.com

Created by author with data compiled from Zephyr database, 2008.

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