



AN INTRODUCTION TO SAFE WORLDS

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1. Introduction

The purpose of this document is to help investors and others understand Safe Worlds. As the person who discovered Universal Logic that has made Safe Worlds possible, and as one of a small handful that now know how to apply Universal Logic to computer systems, I would like to help you understand the importance of this discovery.

It is my belief that Safe Worlds is one of the most important breakthroughs in computer science, ever. To understand the basis for this bold claim it is important to know that Safe Worlds is what Tim Berners-Lee (the inventor of the World Wide Web) and the World Wide Web Consortium (W3C) call “The Semantic Web”. It is what others are calling Web 3.0 and Web 4.0. I call the system Safe Worlds for commercial reasons.

(See: http://en.wikipedia.org/wiki/Web_3.0)

Berners-Lee and the W3C, and all the major computer software vendors have been trying to develop The Semantic Web (and Web 3.0); a system like Safe Worlds, for several years now – without success. Apart from Safe Worlds, no one has been able to design a truly semantic web.

- “Recently, many interesting issues were presented and discussed at various Semantic Web events (ISWC, IJCAI, AAAI, & ECAI workshops). However, events leave us with the impression that **an attractive integrated example of what the Semantic Web can provide does not yet exist.**” (The Semantic Web Challenge, 2004 report)
- “Analysts and technologists who follow the W3C's work closely say that even after years of work and the publication of several foundational documents, **they still have no idea what the Semantic Web is.**” (Paul Festa, CNet News.com, March 2005)

2. What is The Semantic Web?

“The **Semantic Web** is a project of the World Wide Web Consortium (the “W3C” - www.w3c.org) that intends to create a universal medium for information exchange by giving **meaning**, in a manner understandable by machines, to the content of documents on the World Wide Web. Currently under the direction of its creator, Tim Berners-Lee of the World Wide Web Consortium, the Semantic Web is intended to

extend the ability of the World Wide Web through the use of standards, markup languages and related processing tools. Currently, the World Wide Web is based primarily on documents written in HTML, a language that is useful for describing, with an emphasis on visual presentation, a body of structured text interspersed with multimedia objects such as images and interactive forms. HTML has limited ability to classify the blocks of text on a page, apart from the roles they play in a typical document's organization and in the desired visual layout. The Semantic Web is expected to address this shortcoming, using the descriptive technologies RDF and OWL, and the data-centric, customizable markup language XML. These technologies are combined in order to provide descriptions that supplement or replace the content of Web documents. Thus, content may manifest as descriptive data stored in Web-accessible databases, or as markup within documents (particularly, in XHTML interspersed with XML or, more often, purely in XML, with layout/rendering cues stored separately). The machine-readable descriptions allow content managers to add meaning to the content, thereby facilitating automated information gathering and research by computers.” (http://en.wikipedia.org/wiki/Semantic_Web)

3. What is Web 3.0

“**Web 3.0** is one of the terms used to describe the evolutionary stage of the Web that follows Web 2.0. Given that technical and social possibilities identified in this latter term are yet to be fully realized the nature of defining Web 3.0 is highly speculative. In general it refers to aspects of the internet which, though potentially possible, are not technically or practically feasible at this time.” (http://en.wikipedia.org/wiki/Web_3.0)

4. What is the World Wide Web (1989-1994)?

“**The World Wide Web is one of the parts of the Internet** that many people are most familiar with. As the Internet grew through the 1980s and early 1990s, many people realized the need to be able to find and organize files and related information. The solution, called the World Wide Web, was invented by **Tim Berners-Lee in 1989**. He was then a physicist working at CERN, the European Particle Physics Laboratory, and wanted a way for physicists to share information about their research. His documentation project was the source of the two key inventions that made the World Wide Web possible.” http://en.wikipedia.org/wiki/History_of_the_Internet#World_Wide_Web

5. What is the Internet (1969)?

“**The Internet** is the publicly available worldwide system of interconnected computer networks that transmit data by packet switching over the Internet Protocol (IP). It is made up of thousands of other, smaller business, academic, and government networks that provide various information and services, such as by electronic mail, online chat, and on the graphical, interlinked World Wide Web. Because it is the largest, most extensive internet (with a small *i*) in the world, it is simply called *the* Internet (with a capital *I*). The earliest idea of a computer network intended to allow general communication between users of various computers was the ARPANET, the world's first packet switching network, which first went online in 1969. The Internet's roots lie within the ARPANET, which not only was the intellectual forerunner of the Internet, but was also initially the core network in the collection of networks in the

Internet, as well as an important tool in developing the Internet (being used for communication between the groups working on internetworking research).”
<http://en.wikipedia.org/wiki/Internet>

6. The History of the World Wide Web and the Semantic Web

The following is a calendar of the major events in history of the World Wide Web that grew from a single Web site in 1990 to the global phenomenon it is today. Published in the MIT Review in October 2004:

- 1980 Tim Berners-Lee, a consultant with the European Center for physics research CERN, writes software that allows electronic documents to link to each other.
- 1990 Berners-Lee dubs his global hypertext program the “World Wide Web.”
Number of Web sites in existence: **one** (1).
- 1993 Marc Andreessen releases the Mosaic Web browser, which was the basis for Netscape released in 1994.
- 1994** The World Wide Web Consortium (W3C) is founded. The number of Web sites reaches **10,000**. Berners-Lee presents the idea for the **Semantic Web**.
- 1998 W3C releases the eXtensible Markup Language (XML) specification. It allows Web page text to be tagged with descriptive labels - critical for the Semantic Web.
- 2000 By year’s end, **25,675,581 Web sites** have been identified.
- 2004 Standards (*plural*) that allow computers to exchange Semantic Web information are finalized. Berners-Lee is knighted by Queen Elizabeth II.

7. Why The Semantic Web is Important

To appreciate the importance of The Semantic Web (Safe Worlds), it is necessary to understand that such a “meaningful”; and therefore “artificially intelligent”, system is needed to overcome the problems associated with the growing complexity of computer systems, and issues such as cost, privacy, and security, that are now preventing e-business (B2B) from happening on a global scale.

To understand the extent of these problems and the impact that they are having on the IT industry and the world economy, it is important to have an overall understanding of the Internet (the “Net”), and particularly the World Wide Web (the “Web”); the attempts being made to use these systems for e-business; and the enormity of the problems that are being encountered.

The reality is that after more than 15 years of trying, e-business on a global scale is just not viable on the World Wide Web because it is not designed for e-business and it is extremely unlikely that it will ever be adaptable, as required. This is why, as early as 1994, Tim Berners-Lee, three years after inventing the World Wide Web, started trying to develop The Semantic Web.

- **“The Semantic Web is essential,”** Tim Berners-Lee said in 1999, “...before electronic commerce expands as a mass of vaguely defined semantics and ad hoc

syntax which leaves no room for automatic treatment, and in which the court of law rather than a logical derivation settles arguments.”

8. Global e-business - the ultimate Application of the Internet

Everyone everywhere wants to use the Internet for business. However, ignorance of the Net's and the Web's limitations have confused e-business system designers for more than a decade now and caused investors to lose \$billions, particularly in the dot.com era - 1999-2001. The big problem, as Stanford University professor of computing, David Cheriton said in newspaper interview in November 2004:

- “The Internet is dangerously insecure. ...Unless we do something soon, the Internet will become the largest target of attack on the planet in terms of doing economic damage.” (Melbourne Age, November 2003)

In this statement we can accept that Cheriton is referring to the Internet and the World Wide Web as the same thing. This is common and not correct.

9. The Main Issues

The cost of Web-based systems is a major issue preventing a widespread move to e-business. However, the lack of privacy and security is at the core of businesses' concerns about the World Wide Web and the Internet today. Few businesses, particularly in the important small to medium sized enterprise (SME) sector, are prepared to risk all that they have on Web-based systems that are now easy targets for hackers and other cyber criminals.

The reason why Web-based systems are so insecure is that they are all custom built applications. Without a common standard for e-business like Safe Worlds, there is no easy way for these Web-based silo systems to be secured to deliver acceptable levels of privacy and security, or the necessary cost reductions that are needed for e-business to happen on a global scale.

10. Integration and Interoperability

For online privacy and security to be possible on a global scale, and the necessary cost reductions to happen, a fully integrated, fully interoperable platform is needed. This is what Safe Worlds is.

Technically speaking, total integration and interoperability are only possible in a truly semantic system. They are impossible to achieve in the case of the World Wide Web. This is why Berners-Lee and the W3C are now trying to develop the Semantic Web. It is not possible to have a Semantic Web that is not fully integrated and fully interoperable.

- “Through the semantic unification of the modelling framework interoperability of enterprise models is assured.” (US National Institute for Science and Technology – current) <http://www.mel.nist.gov/workshop/iceimt97/pap-kk1/pap-kk1.htm>
- “Being an Internet business means that all the firm's business processes must be integrated and inter-connected with the rest of the online economy.” (Andrew

COMMERCIAL IN CONFIDENCE

Whinston, Professor of Economics and Computer Science, The University of Texas at Austin, US Senate Hearing on “The Role of Standards in the Growth of Global Electronic Commerce”, 28 October 1999)
<http://commerce.senate.gov/hearings/1028whi.pdf>

Safe Worlds is a fully integrated, fully interoperable (semantic) system. It is not a retrofit of the Web, but an original, semantic design into which existing Web-based enterprises can move (they can also be connected) that want to do e-business in privacy and security.

To be integrated means to be interoperable.

11. Limited E-business on the Web

In making these comments, I am aware that some e-business (or e-commerce as it is often also called) is now being done on the Web, particularly by large corporations (big manufacturers using custom built intranets) and governments that can afford the cost. However, the amount of e-business that is now being done on the World Wide Web is a fraction of the global potential of e-business.

- “In 2006, e-commerce grew faster than total economic activity in all of the four major economic sectors covered by the *E-Stats* report. However, change over time in the e-commerce share of each sector’s overall shipments, sales, or revenues **continues to be gradual.**”
- Manufacturers led all industry sectors, with e-commerce accounting for 31.2% (\$1,568 billion) of total shipments—up substantially for the fifth straight year.
- Merchant Wholesalers, including Manufacturing Sales Branches and Offices (MSBOs), ranked second, with e-commerce accounting for 20.6% (\$1,148 billion) of total sales.
- Retailers’ e-commerce sales increased by 22%. As a share of total retail sales, however, e-commerce sales remained modest—2.7% (\$107 billion), up from 2.4% (\$87 billion) in 2005.
- E-commerce sales for Selected Service Industries, a special group of service industries created for the E-Stats report, increased by 14.9%. E-commerce accounted for 1.8% (\$114 billion) of these industries’ total revenues—up from 1.7% (\$99 billion) in 2005.” (US Census Bureau, May 2008)

None of the above e-business is integrated or interoperable on a global scale.

This is why President George W Bush said in His 2002 Homeland Security Information Initiative that:

- “America’s information infrastructure is a source of both great strength and considerable vulnerability. ... The homeland security information initiative has two key objectives: goal 1: Tear down unwarranted information "stovepipes". (President George W. Bush’s 2002 Homeland Security Information Initiative)

Most IT experts know about this problem. However, it is rarely discussed in the public media.

- “The World Wide Web (WWW) was initially intended as a means to share distributed information amongst individuals. Now the WWW has become the preferred environment for a multitude of e-services: e-commerce, e-banking, e-voting, e-government, etc. ...The operating systems, on which Web applications are running, **have shown to be insecure, and open up ways with which security can be circumvented.** .. The privacy of the user is very difficult to protect. ... While the World Wide Web has already reached a certain level of maturity, there is definitely still some progress to be made before all real-life services can be securely provided in an electronic way.” (Claessens, Preneel and Vandewalle, First Monday, 2008)

12. The importance of Interoperability

No word is more widely misused and misunderstood in the IT industry than the word “**interoperability**” – a close second is the word “**integrated**”. First, what needs to be understood by the casual observer is that integrated systems are interoperable; and to be integrated and interoperable, they must also be semantic. If a system is not integrated, it is not interoperable or semantic, and vice versa. The extent to which a system is integrated, determines the extent to what that system is interoperable and semantic.

The 2003 EU Commission’s Working Paper on enabling seamless (fully integrated and fully interoperable) e-Government: "Linking up Europe: the Importance of Interoperability for e-Government that found that:

- **"information systems today are not interoperable."**

Where confusion arises when the IT industry speaks about integration and interoperability, is, because there are many parts of e-business and any two parts of a business system may be integrated in themselves, and therefore they can be said to be interoperable. However, they are only integrated and interoperable to their own extent – they are not necessarily integrated and interoperable with the system as a whole, or with other systems outside their domain. Unfortunately, because of the importance of integration and interoperability to the marketplace, advertising and IT sales agents regularly ignore this fact and stretch the truth when talking about the integration and interoperability capabilities of their systems.

- “With respect to software, the term **interoperability** is used to describe the capability of different programs to read and write the same file formats and utilise the same protocols. **Interoperability** can have important economic consequences, such as network externalities.” (<http://en.wikipedia.org/wiki/interoperability>)
- “Although interoperability has played an important role in the industrial economy, its need is magnified in (the electronic) economy where interactions and exchanges among firms and consumers occur constantly, in real time, throughout the entire stage of the value chain, and with an increasing number of partners.”

- “Interoperability is a **fundamental requirement** of an efficient network. Through standardization and interoperability, communications software and business applications **lower costs** for products and **increase user benefits.**” (Andrew Whinston, Professor of Economics and Computer Science, The University of Texas at Austin, US Senate Hearing on “The Role of Standards in the Growth of Global Electronic Commerce”, 28 October 1999)

Three Types of Interoperability

The 2003 EU Commission’s Working Paper on enabling seamless (fully integrated and fully interoperable) e-Government: "Linking up Europe: the Importance of Interoperability for e-Government that found that, **"information systems today are not interoperable."** also helps us better understand interoperability by saying that: "Interoperability has **three aspects**:

- (i) **Hardware interoperability**, which is concerned with the technical issues of linking up computer system hardware, and the necessary telecommunications infrastructure.
- (ii) **Software interoperability** that is concerned with organizational interoperability, which is the modelling of business processes, aligning information architecture with organizational goals and helping business processes to co-operate; and
- (iii) **Semantic interoperability** that is concerned with ensuring that the precise meaning of exchanged information is understandable by any other application of the system.”

Hardware disintegration and disinteroperability is evidenced by the problems that exist between Apple Computer systems and PCs like those pioneered by IBM.

Having said this, it is widely recongized that:

- “Technological standards at the infrastructure (hardware) level are relatively **easier to reach** than those at the applications and business process (software) levels.” (Andrew Whinston, Professor of Economics and Computer Science, The University of Texas at Austin, US Senate Hearing on “The Role of Standards in the Growth of Global Electronic Commerce”, 28 October 1999)

The extremely difficult-to-deliver interoperability at the applications and business process levels (software) is what the Semantic Web is expected to deliver. This is what Safe Worlds delivers now.

13. Interoperability, Universal Logic and the Semantic Web

Semantics is the study of meanings; it is the logical connection (relativity) between things and what they mean. The Semantic Web must protect and convey meaning between communicating parties - Safe Worlds does. Unlike XML, the Universal Logic used in Safe Worlds does not impose meaning but provides the mechanism (the data structure) for users to covey what they mean.

- “The Semantic Web is primarily a tool for **interoperability**. The project will involve the creation of **interoperating systems** ...a software and information environment, in which complex applications can **interoperate** by exchanging information with a basis in high level logic and well-defined meaning.” (Tim Berners-Lee, “The Semantic Web Road Map”, February 2000)

Logic (sometimes referred to in relation to computer systems as business or process logic) is the process, or reasoning mechanism by which meaning is communicated (conveyed) from one thing to another; one human being to another, or one machine to another, as is the case in a semantic computer system.

Meaningful (semantic = logical) communication is essential to e-business.

All logic, as George Boole, the father of Boolean logic explained in the 19th Century, is systematic. This means that it can be computerized as the widespread use of Boolean logic proves.

The problem is that, as the use of Boolean logic and the multitude of computer system silos that now exist, proves, there can be many, many different forms or expressions of logic – the number is as infinite as human imagination.

The key, and our saving grace is that, by definition and logic there must be a common or Universal Logic for many other forms of logic to exist. By definition however, there can only be one universal or common form or language of logic and therefore only one Semantic Web. This is what the term “universal” means.

To be universal means that that the logic of logic (the law of logic) must be common to every other form of logic and therefore every language, because all language is a form of logic. There cannot, therefore, be two universal languages of logic, just as there cannot be two laws of relativity, or two laws of gravity.

- “In the same way that universal algebra is a general theory of algebraic structures, universal logic is a general theory of logical structures. During the 20th century, numerous logics have been created: intuitionistic logic, modal logic, many-valued logic, relevant logic, paraconsistent logic, non-monotonic logic, etc. Universal logic is not a new logic. It is a way of unifying this multiplicity of logics in a way that can be applied to all logics.” (The 1st World Congress on Universal Logic planned for 2005 – <http://www.uni-log.org/one2.html>)

14. Definition – the Facts about Universal Logic

By definition, Universal Logic is self-explanatory (meaningful = semantic) – it must be if it is fully integrated and fully interoperable, because to fit this description it cannot rely on another language (logic) for its explanation or existence. If it does, then it is not the universal language of logic (language = communication).

This fact is supported by what Tim Berners-Lee and all reputable Semantic Web researchers agree are the essential parameters for Universal Logic. They agree that it must have:

1. A reasonably **compact syntax**.
2. Well defined **semantics**.
3. Sufficient expressive power to **represent human knowledge**.
4. An efficient, powerful, and understandable **reasoning mechanism**
5. It must be suitable for building **large knowledge bases**.

To represent human knowledge (3), obviously Universal Logic must reflect the way that the human mind thinks (reasons = processes) to create knowledge, otherwise it could not meet this test. Tim Berners Lee in on record however as having said that:

- “It has proved **difficult** to achieve the **third (3)** and **fourth (4)** properties simultaneously.”

6. Denial of the Mind

Why it is so difficult for mainstream scientists to find and understand Universal Logic is because, as, psychologist and Princeton professor Philip N. Johnson-Laird says in his book “Computers and the Mind,” science, throughout most of the 20th Century has been in “**denial of the mind**”. As strange as it may seem, many in science today do not even recognize that “the mind” exists, or for that matter, have any idea what is meant when we speak of “the mind”.

I suggest that this is a major mistake, and a failing of science, because, if one is trying to find the universal language of logic that replicates the reasoning mechanism of the human mind, one should first try to find and study the human mind.

The logic of the mind’s existence “is made manifest in all its generality by reflection upon a single application of its application,” George Boole said in his book “The Laws of Thought on which are founded the mathematical theories of Logic and Probabilities”. In other words, Boole is saying that we can prove that we have a mind by a single instance of thought.

- “This is ...evidence that the particular principle or formula in question is founded upon some **general law or laws of the mind**. ...The general knowledge of the laws of the mind,” Boole said, “does not require as its basis any extensive collection of observations ...but is involved in the clear apprehension of a single instance.” (The Laws of Thought)
- “One cannot denote any part or state of a brain by referring to mind,” Gerhard Gelbmann said in a review of “Umberto Eco’s Perspective on *Semiotics* and Problems Combined with It”. “Trying to denote mind" is not the same as trying to denote "brain", because in the first case one talks of an abstract object through reference or demonstration of a mental process and in the second case one talks of a physically given thing by pointing at it with other words like ‘cerebrum’.”

And we have to do this because the mind, like every law, is spiritual and therefore invisible, whereas the brain is material and therefore can be seen, touched, and felt. Because this is a world of opposites, one (1) is spirit and the other (2) is matter – it’s as simple as that.

COMMERCIAL IN CONFIDENCE

Speaking about the logic of the human mind, George Boole said:

- “Logic ...lies at the very foundations of general **reasoning**. ...Language is an instrument of human **reasoning** ...the most important of our intellectual faculties ...this is a law of thought ...it is actually developed in **a law of language**, the product of the instrument of thought.”
- “Pure mathematics was discovered by George Boole in his work published in 1854,” British mathematician and philosopher, Bertand Russell said.

This is proven true by the fact that Boolean logic is now the mainstay of modern computerization.

- “In ordinary language, **logic is the reasoning** used to reach a conclusion from a set of assumptions. Logic provides **prescriptions for reasoning**, that is, how people—as well as other intelligent beings, machines, and systems—ought to reason. Traditionally, logic is studied as a branch of philosophy. Since the mid-1800s logic has been commonly studied in mathematics, and, even more recently, in computer science. As a science, logic investigates and classifies the structure of statements and arguments and devises schemata by which these are codified. The scope of logic can therefore be very large, including reasoning about probability and causality.” (<http://en.wikipedia.org/wiki/logic>)

Despite this logic that was first published in 1854, computer scientist Johnson-Laird says that:

- “In the United States the study of mental processes was **abandoned**; the introspective technique was replaced by the controlled observation of responses in the laboratory. ...**The mind was expelled** from its original place in the Dualistic scheme: it was a ghostly mystery that had no role in determining behaviour. ...The **taboo on the mind** was reinforced by a seductive argument made by a number of Behaviorists, notably B. F. Skinner.”

This argument concludes, he says, that:

- “In framing psychological laws, there is no need to refer to mental states. They are either unnecessary or unmentionable.”

Johnson-Laird disputes this conclusion. He says that:

- “It is based on two false assumptions. The first is that the sole purpose of science is to frame parsimonious laws.”

Parsimonious laws are the easiest to accept. Parsimony is a scientific rule that states that if there exists two answers to a problem or a question, and if, for one answer to be true, well-established laws of logic and science must be re-written, ignored, or suspended in order to allow it to be true, and for the other answer to be true no such accommodation need be made, then the simpler of the two answers is much more likely to be correct. Put a simpler way: parsimony is a principle that states that the simplest explanation that explains the greatest number of observations is preferred to more complex explanations. In other words, in this context, the human mind is too hard to understand, and therefore cannot exist.

- “The second false assumption,” Johnson-Laird says, “is that psychology should concern itself solely with the sequence of a stimulus in the external world giving rise to an overt response.” However, he says, “Some behaviours are not controlled by environmental stimuli. Many human skills – from spontaneous speech to the solving of intellectual problems – are not governed by events in the environment but depend on complex mental processes. Likewise perception (the study of which was largely eschewed by the Behaviourists) does not necessarily give rise to any overt behaviour. If perception, thought and communication are explained, mental processes (logic) must be involved,” he said.

When designing a semantic system, one also quickly discovers that many, if not most, of the concepts of business are mental – they are inventions of the human mind and have nothing to do with the physical world in which we live.

As obvious and logical as this is, many in science are still not convinced by this argument. As a result, we see that Johnson-Laird concludes in his book that:

- “What began as an objective science (the search for the laws of nature) has become an ideology,” rather than a true science.

And this is the great stumbling block for science today, where deeply held ideologies commonly hold more sway than sound science and hinder the progress of the world, particularly in the direction of artificial intelligence and such necessities as the Semantic Web.

7. The High Cost of Ideology over Sound Science

Computer science, in particular, pays a big price for being caught up in such ideology, because it means that computer scientists have virtually no way to develop artificial intelligence (AI), which is synonymous with the Semantic Web and computer automation, because fully integrated, fully interoperable computers are extensions of the human mind, like every other tool that we use, that has ever been invented.

To replicate how the mind works; to be able to create an efficient, powerful, and understandable reasoning mechanism that has sufficient expressive power to represent human knowledge, that can be used for building large knowledge bases, we must first know how the mind works that is uniquely able to comprehend such requirements. And when we do, by default, we will find that it has a compact syntax and well defined semantics - because it is logical that it does.

We see therefore, computer scientists like IBM researchers Kephart and Chess who are working on autonomic computing, ask in their 2004 paper, “The Vision of Autonomic Computing,” authorised by the IEEE:

- “Is it possible to meet the grand challenge of autonomic computing without magic and without fully solving the AI problem?”

One moment of logical thought tells that it cannot be possible to make systems that (a) represent human knowledge and (b) provide an efficient, powerful, and

COMMERCIAL IN CONFIDENCE

understandable reasoning mechanism, as the W3C says is necessary, without first understanding how the human mind works.

- “It is inconceivable,” Isaac Newton said, “that inanimate brute matter should, without the mediation of something else, which is not material, operate upon and affect other matter without mutual contact.” (I. Benhard Cohen, Preface to Sir Isaac Newton’s “Opticks”)
- “It is the ability inherent in our nature to appreciate order, and the concurrent presumption, however founded, that the phenomena of nature are connected by a principle of order. Without these, the general truths of physical science could never have been ascertained.” (George Boole, “The Laws of Thought”)

Although they ask this question, Kephart and Chess acknowledge in their paper that:

- “The success of autonomic computing will hinge on the extent to which theorists can identify universal principles that span the multiple levels at which autonomic systems can exist – from systems to enterprises to economics. ... Bridging the language and cultural divides among the many disciplines needed for this endeavour and harnessing the diversity to yield successful and perhaps universal approaches to autonomic computing will perhaps be the greatest challenge.”

What this means in fact, although one is left wondering if Kephart and Chess realize this fact, is that the success of autonomic computing that IBM is actively promoting, relies on Universal Logic; the only universal way to integrate (bridge) all the different languages. Like most other computer scientists in the world today that are involved in the search for the Semantic Web, it is clear however that Kephart and Chess have not yet come to the belief that such universal principles cannot exist outside the human mind, because the human mind is the only thing capable of comprehending reality (logic). Logic (principle = law = discipline) is synonymous with the human mind.

We see therefore that when Tim Berners-Lee was asked by Business Week Magazine on 27 March 2002, “Where do things stand (with the Semantic Web) now?”

- “The upper layers are still in research, the upper layers being things like a universal logic language that can basically represent *any* logical statement. ... **There is a need for a powerful universal logic language.**”
- “To achieve its potential, the Semantic Web must provide **a common interchange language** bridging these diverse systems,” Tim Berners-Lee said in the paper “Semantic Web Development – Technical Proposal”, dated February 4, 2000, four years before Kephart and Chess’ paper. “Like HTML, the Semantic Web language should be basic enough that it does not impose an undue burden on the simplest web software systems, but powerful enough to allow more sophisticated components to use it to advantage as well.”
- “The strategy is to translate the various languages into **a common 'base' language** thereby providing them with a **single** coherent model theory,” W3C Working Group Note 10 relating to “Semantics for Languages of the Semantic Web” said on October 2003.

- **Finding the ULL and Safe Worlds**

Although for commercial reasons I have not widely publicised the fact, I discovered the critical universal logic language (Universal Logic) that Tim Berners-Lee says is essential, in 1999. I know that it is Universal Logic, because, using this knowledge, we have subsequently built the world's first truly semantic database (2005) and now the Safe Worlds system (2008) that is currently being used by more than 100 users worldwide.

I believe that I was able to make the breakthrough discovery, because, while science has been "in denial of the mind," I have long been a student of the human mind (the reasoning process that enables us to think) and how this process can be computerized.

The focus of most of my 20-year R&D effort into using the Internet for e-business that started in 1983 was to identify this mechanism (logic) that the mind uses to convert what we see into knowledge, language, and belief. This is what the Universal Logic that is used in Safe Worlds does.

Many still question the existence of such an algorithm that is analogous with looking for the law of everything. However, as George Boole says in his book "The Laws of Thought":

- "The logic of the mind's existence is made manifest in all its generality by reflection upon a single application of its application,"

In other words, we can prove to ourselves that we have a mind, and that it works according to logic, by a single instance of thought. We can understand the importance of thought, by understanding what it means to each and every one of us. Clearly, we could have no awareness of anything, without the ability to think – we would not even know that we exist. Clearly also, thought is a process; and if it is a process, then it is an algorithm that can be computerized.

- **The World Wide Web Consortium's Effort**

We can assume that because Tim Berners-Lee know the importance of Universal Logic, that the World Wide Web Consortium, of which he is the director, also understands the importance of Universal Logic, although it clearly does not yet know what it is. In the absence of such understanding, the W3C is trying to patch together several different forms of logic into a form of universal logic.

- As a result, a W3C Working Group Note dated 10 October 2003 says that, "there will be many Semantic Web languages, most of which will be built on top of more basic Semantic Web language(s)."
- This is happening despite the fact that the same working group note says that, "experience to date (particularly with the OWL standard under development at the time of writing by the W3C Webont working group) shows that quite difficult problems can arise when layering model theories for extensions to the 'basic' RDF layer [RDF] of the Semantic Web. This strategy places a very high burden on the 'basic' layer, since it is difficult to anticipate the semantic demands which

COMMERCIAL IN CONFIDENCE

will be made by all future higher layers and the expectations of different development and user communities may conflict. Further, we believe that a melange of model theories will adversely impact developers building agents that implement proof systems for these layers, since the proof systems will likely be different for each layer, resulting in the need to micro-manage small semantic variations for various dialects and sub-languages (cf. the distinctions between various dialects of OWL).” <http://www.w3.org/TR/2003/NOTE-lbase-20031010/>

- These difficulties were foreshadowed by Professor Andrew Whinston, in his submissions to US Senate Hearing on “The Role of Standards in the Growth of Global Electronic Commerce”, in 1999, where he said that, “as we move towards setting standards that deal not only with information exchange, transaction and billing automation, and payment clearing services, but with trading practices, negotiation, pricing, and other market making activities, our effort to standardize and codify these processes will become **extremely difficult**.”

Safe Worlds does not have these problems being experienced by the W3C because Safe Worlds is based on only **one** form of logic (Universal Logic) that adapts to **any** application, and this is what is needed:

- “The **biggest challenge** is that there is **no single standard** format for bill data,” (John Shields of Patelco Credit Union, 2000)
 - “There is **no single standard** to help map disparate data formats, including electronic data interchange and business processes into a uniform view.” (Information Week, 11/29/99)
 - “The challenge is to create a **common set of parameters** and clean and normalize all items so that they can be classified and categorized to present a common view (one way),” InformationWeek said in November 1999.
 - “**Every vertical industry needs a common way** of describing business processes specific to its requirements.” (InformationWeek 11/29/99)
 - “Establishing some form of **uniform commercial environment is essential** in promoting global electronic commerce.” (Andrew Whinston, 1999)
- **Progress - The W3C’s Effort to create the Semantic Web**

In September 2004, Tim Berners-Lee announced in an article published in MIT Review that the W3C has started to develop what they call the Semantic Web. Over the past decade, the W3C has established a worldwide network of companies and universities involved in the Semantic Web effort and the policy of the W3C is to test such new developments in-house and they have announced that they have started to work with universities in the life sciences area, to build the first Semantic Web sites.

Having made this announcement however, it is important to note, if one can “read between the lines”, that Tim Berners-Lee acknowledges in this MIT Review article, that the W3C does not yet have the critically important universal logic language (ULL). This is confirmed by the Semantic Web Challenge group that said in November 2004 that:

COMMERCIAL IN CONFIDENCE

- “An attractive integrated example of what the Semantic Web can provide **does not yet exist**.” (The Semantic Web Challenge, 2004 report)

Q: MIT Review: “Does the Semantic Web merely automate many of the things that a human assistant would do?”

A: Tim Berners Lee: No. A human assistant uses a form of intelligence that we are not mimicking here. The human assistant will have the human mind’s ability to suddenly think of correlates across the whole spectrum of his or her experience. In the future, the Semantic Web will be a great place to develop artificial intelligence, AI, in the strong sense. But right now we are making something quite mechanical, even if we are using bits and pieces of the machinery developed by the AI community over the years.”

By now you should know that this is not the way that it works, but the other way around: first you must understand intelligence (how the mind works), before you can develop artificial intelligence. More importantly however, until you understand artificial intelligence, you cannot create the Semantic Web.

We see therefore that instead of Universal Logic, the W3C effort:

- “is based on the Resource Description Framework (RDF), which integrates a variety of applications using XML for syntax and URIs for naming.” (See <http://www.w3c.org/2001/sw/>)
- They say that the RDF specifications provide “a lightweight ontology system to support the exchange of knowledge on the Web.” (See: <http://www.w3.org/RDF/>)

The RDF Specifications build on URI and XML technologies. The RDF suite of specifications, consist of:

- RDF/XML Syntax Specification (Revised)
- RDF Vocabulary Description Language 1.0: RDF Schema
- RDF Primer
- Resource Description Framework (RDF): Concepts and Abstract Syntax
- RDF Semantics

Ontology

In addition to its RDF specifications, the W3C’s current version of the Semantic Web relies on OWL (Ontology Web Language). Ontology is a branch of metaphysics (physics of the mind) relating to the nature and relations of being. Metaphysics is a division of philosophy that includes ontology and cosmology. Philosophy is the search for truth through logical reasoning. Things that are true are logical.

- “Ontology is the **key technology** in semantic information processing. The challenge is to develop, apply and share ontologies in a diverse range of applications, from knowledge management to e-business to industrial

COMMERCIAL IN CONFIDENCE

engineering.” (Conclusions from the European Commission's Enterprise Directorate General, 2002 Diffuse Conference, Brussels, 12 December 2002) The only way to do this is through universal logic.

- “The OWL Web Ontology Language is designed for use by applications that need to process the content of information instead of just presenting information to humans. OWL facilitates greater machine interpretability of Web content than that supported by XML, RDF, and RDF Schema (RDF-S) by providing additional vocabulary along with a formal semantics. OWL has three increasingly-expressive sublanguages: OWL Lite, OWL DL, and OWL Full.” (See: <http://www.w3.org/TR/owl-features/>)

By comparison with OWL, the Safe Worlds' Universal Logic is one logic language that is language independent. This means that it can be expressed in any language and therefore it can be computerized so as to integrate and make interoperable all the diverse systems (different forms of logic) in the world.

W3C Research Goals

The W3C's published and yet-to-be-achieved design goals (<http://www.w3.org/TR/webont-req/#section-goals>) for OWL reveal the current shortcomings of the OWL language:

- Using established ontologies
- Changing established ontologies
- Integrating established ontologies
- Detecting inconsistencies across ontologies and instances of use
- Providing a balance between expressivity and scalability when creating ontologies
- Avoiding unnecessary complexity which may discourage widespread adoption
- Maintaining compatibility with other standards
- Supporting internationalization

These goals are all achievable within Safe Worlds. However, they are only goals for OWL, because OWL is not based on the universal logic language (ULL) – it does not incorporate artificial intelligence.

- “Recently, RDF (Resource Description Framework) and OWL (Web Ontology Language) became W3C Recommendations, which means they are official standards,” Jim Rapoza, of eWeek said in March 2004. “However, there are still many hurdles to overcome before the dream of the Semantic Web becomes reality.”
- “Unfortunately, RSS degenerated into one of those classic religious technology wars where competing standards are very close and could easily be rolled into one true standard. But the standards continue to remain separate because no one is willing to give in.”

Commenting also on the W3C's version of the Semantic Web, on 31 May 2004, Computerworld's senior columnist Frank Hayes said:

COMMERCIAL IN CONFIDENCE

- “The Semantic Web (the W3C version) could have a huge impact on how your company does business, but it's an order of magnitude **more complex than the original Web.**”

Safe Worlds will not have these problems because Safe Worlds users do not have to worry about applying mark-up tags to their content. This is done automatically, and can be handled in this way because all content is formatted according to the one standard (one form of logic).

XML is not Universal Logic

The W3C championed the development of XML and the world is now relying on XML and so-called Web services that have been developed with XML, to provide the solution to the integration/interoperability problem. However, it is important to also understand that:

- “XML, SGML, and HTML are not standards but rather the building blocks from which the standards are derived. If you view these specifications as the words that make up a language, standards are the semantics of the language.” (e-Bill Magazine, April 2001)

Web services are not the answer

Most major international service firms, major computer vendors, major corporations, agencies like the United Nations, and governments are pushing the development of Web Services based on XML communities to provide a solution to the integration/interoperability problem. Many XML communities (vertical markets) exist throughout the world and they have done a vast amount of work towards interoperability, particularly on ontology as it applies to their specific vertical markets. Despite all this effort and investment, intra-enterprise and intra-industry integration is still happening in only a very small way, and inter-enterprise, global integration and interoperability is not happening at all.

Delegates at the Interoperability Conference in Orlando, Florida, in June 2003, organized by the Web Services and XML communities identified the reasons why greater progress is not being made. They say there is:

- “**A ‘roll your own’ mentality** among developers of Web Services - reluctance to give up turf; hidden agendas; and lack of trust among standards organizations;
- **Differing scopes and processes** - incompatible operating processes; varying scopes of standards; different origins and missions of standards groups;
- **A lack of perspective** - failure to see the need for multiple groups contributing to e-business standardization; tunnel vision/inability to see the big picture;
- **A lack of awareness of other groups** - lack of knowledge of the existence of other groups, as well as their goals, missions, activities; lack of time and energy to keep up with the standards world; lack of basic technical understanding; and
- **A lack of common vocabularies** - in both industry and natural languages, as well as **a lack of an international outlook.**”

<http://www.xml.com/pub/a/2002/07/10/interop.html>

In other words, the Web services industry is saying that they need Universal Logic to provide them with direction and stop internal debate.

- “**There is a need for a powerful universal logic language.**” (Tim Berners-Lee, Business Week Magazine, 27 March 2002)

And these problems are not new. They are much the same as those experienced by the builders of the global e-marketplaces in the dot.com area that were supposed to cover the world and capture all e-business. However, as Arnold Berman of Red Herring Magazine said in 2001 about these global e-marketplaces:

- “Companies will admit that agreeing on the wording of the press release was far easier than agreeing on any subsequent decisions. Most will have a very hard time agreeing on much else, including choice of management, location, and technology vendors – as well as which participants in consortia will be required to part with their valuable supply chain secrets to advance the cooperative.”
Ultimately, Berman says that the “failure of these e-marketplace cartels will force companies to buy and build their own Web infrastructure – rather than share the costs Soviet-style.”

This is because they do not have an irrefutable standard – Universal Logic. This is why all the big e-markets have so far failed to achieve their goals. The reality, Infoworld Magazine said on 13 August 2001 is that with existing technology:

- “**Integration is so difficult** that several of the approaches, specifically online marketplaces and B2B software products have left many vendors injured or out of business. The B2B marketplace has now even been referred to as close to dead.”
- “IDC in Framingham, Mass., suggest that for every \$1 companies spend on middleware software and installation, they spend between \$5 and \$20 to integrate back-end disparate and legacy systems.” (Infoworld Magazine, 13 August 2001)
- “The time and effort needed to reach a consensus among international players and governments may prove to be too slow to support rapidly changing technologies and practices in the Internet economy.” (Andrew Whinston, Professor of Economics and Computer Science, at the University of Texas at Austin, told the US Senate Hearing on “The Role of Standards in the Growth of Global Electronic Commerce”, on 28 October 1999)

Only Universal Logic will Work

The W3C’s current version of the Semantic Web may have some success. However, without first having the critically important Universal Logic it will ultimately fail to reach its target, like all these other XML-based efforts, because it will never be a fully integrated and fully interoperable world system as the Semantic Web must be. This means it will never be private and secure as e-business demands. As Tim Berners-Lee said in 2000:

- “To achieve its potential, the Semantic Web must provide a common interchange language bridging these diverse systems.”

The problem facing the W3C's version of the Semantic Web, without Universal Logic, is the same as that which is being experienced at the intra-enterprise level where most industry integration activity is now focused.

- “An alarming new IT trend is in the making,” Gartner research analyst Jeff Comport told NewsFactor Network in July 2003. “Companies are abandoning the best practice of enterprise-wide integration of applications in favour of a point-to-point or tactical approach. However, these companies, simply put, are making a mistake. In fact, they are ‘laying landmines for the next generation.’ Point-to-point integration is an excuse many companies use for their broader IT strategies,” he added. “Companies need to wake up and smell the EAI coffee; all those hand-built connectors cannot ever scale, over time, the way an application layer can.”

“While each discrete project and its subsequent integration may make sense on a tactical basis, Comport said, eventually the company is going to wake up and realize it has built an infrastructure that resembles spaghetti. Sooner or later, such a company is going to have to architect an approach to integration that will pay off over multiple projects.”

The bottom line: sooner or later, every company will need a system like Safe Worlds.

- “Companies developing customer interaction tools, including ordering and e-commerce systems must further streamline the integration of those tools with CRM programs and back-end systems in order to remain viable, according to a recent report from AMR Research. On the e-commerce front, the most effective ordering systems will combine phone, fax, and EDI (electronic data interchange) ordering channels and will be those that effectively integrate supply chain information.” (Kimberly Hill, CRM Daily, May 9, 2002)

Integrating supply chains requires the ability to integrate globally and make all participants in the chain, interoperable.

- “As different infrastructures, protocols and APIs emerge, interoperability will greatly affect the technology decisions made by the governing bodies of “federated” SSO (single sign on systems), as well as ensuing investment decisions by service providers. Companies that don't want to start from scratch every time they launch a new service need to watch what SSO emerges, so they can think ahead in terms of provisioning, billing and customer care issues.” (Sanjay Swamy, Senior director of market development, Portal, March 2002)

They need Safe Worlds.

Universally Applicable

A true Semantic Web must be applicable to any digital application and must be able to integrate and make interoperable, and therefore private and secure, any number of enterprises and their systems and electronic devices. This is because all these things represent some form of logic that is based on universal or common logic.

- “Like HTML, the Semantic Web language should be basic enough that it does not impose an undue burden on the simplest web software systems, but powerful enough to allow more sophisticated components to use it to advantage as well.”

COMMERCIAL IN CONFIDENCE

(Tim Berners-Lee, “Semantic Web Development – Technical Proposal, February 4, 2000”)

- “The standard must be able to rapidly adapt to new business requirements and be affordable to not only the Global 2000 but also the small and medium sized enterprises (SME).” (Tim West, E-Bill Magazine, April 2001)

The Trade Credit Example

Take trade credit for example. Most businesses function on trade credit. However, generally speaking, only entities like banks and credit card companies have the ability to issue and manage credit systems.

- “E-commerce gives companies access to new customers. If they are not paying by electronic debit or credit card, these new customers will need trade credit. This creates new demand for credit assessment and credit extension. But who will provide it?” (Cathryn R. Gregg, Treasury Strategies, AFP Exchange magazine, February 2001)

Safe Worlds is specifically designed to meet this challenge. The Safe Worlds system allows businesses to extend Trade Credit to their customers.

For enterprises to be able to deliver and manage trade credit, a fully integrated, fully interoperable system is needed that provides real time accountability of the credit status of all involved and this must be deliverable to every user in the system.

Real time accountability means that every item within the system must be able to be identified, secured, and valued. The system must also be a one-size-fits-all model, so that **every** user (big and small) can operate like an international credit issuer, if trade credit is to move into cyberspace. To do this requires a universal logic between all the participants as well as system simplicity and inherent automation that is only found in Universal Logic.

- **Progress - Safe Worlds**

Unlike the Semantic Web being developed by the W3C, Safe Worlds is applicable to any business and can deliver all necessary functionalities, such as trade credit.

The Atomic Example

So-called universal, atomic process that underpins the physical world explains how this happens and is possible. To understand the connection between atomic structure and Universal Logic, note what George Boole said about the connection between the mind and the world:

- “It is not very improbable” Boole said, “that . . . the constitution of things without may correspond to that of the mind within.” (George Boole, “The Laws of Thought”)

The great British mathematician and philosopher, Bertrand Russell also believed this. In his book “The Philosophy of Logical Atomism” Russell says:

COMMERCIAL IN CONFIDENCE

- “Everything that we ever experience can be analysed into logical atoms.”

Like the way that thoughts of our mind join together to create our understanding of life, fully integrated, fully interoperable atoms of energy in the physical world join together to create molecules and molecules join together to create compounds, and so on, to create all the different things that there are in the world that we are able to see and scientists are able to understand through the process of reasoning and mathematics.

In the same way that thoughts are the building blocks of our mind, atoms are the building blocks of the physical world, equations are the building blocks of mathematics, words are the building blocks of all spoken language, and the musical notes are the building blocks of music.

Every form of expression (communication = language = logic) works the same way. This is why Newton’s laws of motion and Einstein’s law of relativity apply to everything, because they explain, from their different perspectives, how the building block of life works. And this is what Universal Logic does: only it applies to how the invisible human mind thinks (reasons) and not particularly how physical things work.

The Need for Safe Worlds

- “The need for interoperability in the Internet economy is becoming critical.”
- “An interoperable global electronic commerce system is necessary if we are to maximize the potential benefits of digital networking and computing technologies.
- The need for interoperability will increase as we focus on process automation.”

(Andrew Whinston, Professor of Economics and Computer Science, The University of Texas at Austin, US Senate Hearing on “The Role of Standards in the Growth of Global Electronic Commerce”, 28 October 1999)

- "Interoperability is a fundamental requirement, from both the economic and technical perspectives;"
- "Failure to put in place interoperable e-government systems will have both economic and social costs;" and
- “Without interoperability, both within and between the public and enterprise sectors, electronic ways of working are bound to fail."

(The European Union’s 2003 Working Paper on enabling seamless e-government, "Linking up Europe: the Importance of Interoperability for e-Government)

- “The need for enterprise engineering and enterprise integration is intensifying.
- To integrate business discourse internationally requires not only intra but inter-enterprise integration.”

[US National Institute for Science and Technology (NIST)]
<http://www.mel.nist.gov/workshop/iceimt97/pap-kk1/pap-kk1.htm>

A Global Issue

- “E-commerce is fundamentally global ..global electronic commerce has implications that reach far beyond mere economic gains from trading.” (Andrew Whinston, 1999)

Because e-business is a global issue, meaning that a large proportion of businesses will operate globally in the future, national governments need to also be able to function at this level. Otherwise, how will they collect the tax they need to survive? This is clearly why Andrew Whinston asked the US Senate in 1999:

- “Can government exercise their regulatory powers on the Internet?”

Taxation is the lifeblood of government.

- “In one word, taxation for e-commerce is now a nightmare.” (Billing World magazine, April 2001)
- “Australian government agencies drastically underestimated the complexity of e-procurement and have struggled to move purchasing online. To date, uptake of e-procurement across Australian government agencies has been slower than anticipated. It was not actually an easy win.” (Sally Pfeiffer, NOIE, Australian Financial Review, November 2003)
- "It's an important piece for EMC to be able to control content and make sure it ends up on the hardware platform," (Enterprise Storage Group analyst Brian Babineau, Internetnews.com 14 October 2003)
<http://www.internetnews.com/storage/article.php/3091511>
- “The Securities Industry Association (SIA) and the Securities and Exchange Commission (SEC) has mandated that by 2004 the securities industry will be able to settle all trades within one day. Everything indicates trouble ahead unless the securities industry can find and implement a solution.” (Wall Street & Technology, April 2001)
- “The massive challenge of homeland security dwarfs all our current business intelligence efforts. ...What is clear to us in the Information Industry is that technology can be applied to these challenges with great results ...But the challenge is daunting: how do we quickly provide a single access point to data in disparate systems? And not just "some data", but massive amounts of data, not previously integrated, constantly updated, and on vastly heterogeneous and mostly older platforms.” (William McKnight, Search CRM.com, 20 August 2002)
- President George W Bush: “America’s information infrastructure is a source of both great strength and considerable vulnerability. ...The homeland security information initiative has two key objectives:
 - Goal 1: Tear down unwarranted information "stovepipes".
 - Goal 2: Share homeland security information with States, localities, and relevant private sector entities.

COMMERCIAL IN CONFIDENCE

To help meet these needs, the Administration will establish a uniform national threat advisory system.” (President George W. Bush’s 2002 Homeland Security Information Initiative)

The question is: How can these goals be achieved without a system like Safe Worlds?

Customer Churn

Customer turnover or “churn” is another of the big problems of operating in a disintegrated e-business environment where participating businesses are unable to protect their hard-won and long-established customer relationships.

- “Millions in revenue are lost to churn. Service providers today lose \$250 million to customer churn, even though they spend \$10 million on billion software and services; \$20 million on direct marketing; and \$150 million on new OSS.” (Billing World magazine, April 2001)
- “Customer churn is a familiar headache to long-distance carriers and wireless voice providers, and it has now become an important issue for broadband carriers. Given the cost to acquire a customer, it’s far less expensive to keep customers than to churn them.”
- “The annual cost of customer ‘churn’, or defection, can run into the hundreds of millions of dollars - which places companies in the position of continuous customer recruitment in order to replace those who have defected to competitors.” (SBS Events, February 2005)

Customer Acquisition costs – while customer churn has increased, customer acquisition costs also remain high.

- “Unfortunately, the cost of acquiring consumers beyond the early adopters has financially exceeded the revenue generated from those customers,” according to Timothy Monnin, First Union Securities (Future Banker, April 2001)
- “Customer acquisition costs have lingered in the \$200 to \$500 range per customer, making the addition of new customers a costly proposition. With this type of scenario, a service provider needs to retain a customer for a minimum of two years before they recoup the cost of attaining that customer and begin benefiting from profits.” (“Decreasing customer churn”, Milind Gadekar, TelephonyOnline.com, Jun 26 2002)

Safe Worlds significantly solves the customer churn and the customer acquisition cost problem by providing businesses with a way to effectively integrate themselves with their customers and suppliers into fully integrated, fully interoperable e-marketplaces where methods can be applied to minimize this problem without broadcasting them to the world, as is now the case in most e-market applications.

Safe Worlds and the Digital Divide

The United Nations and others have noted that the “digital divide” between rich and poor nations and big and small businesses, is one of the big challenges of the digital age. The current reality for small business is:

COMMERCIAL IN CONFIDENCE

- “The potential benefits from e-Business implementation are staggering, but far too often, so are the costs.” (United Process Group, 1 October 2004)
- “Despite being used for over 20 years, e-business has so far been limited to larger organisations in a few industry sectors such as automotive and retail.” The reason this is happening is simply, that for two businesses to automate a collaborative process the cost of setting up the automation needs to be less than the benefit that is gained. The reality today is that the set-up cost is prohibitive except for high volume/high value processes between large organisations.” (2002 NOIE Interoperability Workshop)
- “The Internet was supposed to help small business make a killing, but guess who’s the homicide victim?” (Forbes Magazine, 1/10/00)
- “The price tag is over US\$1 million,” (Forbes Magazine, 1/10/00) for a Web-based e-business system.
- “Gartner Group has found that a typical B2B site costs about US\$1.2 million to develop and takes at least six months to build.” (ComputerWeekly, e.businessreview, 10/00)
- “Forrester Research estimates the cost of an e-business system at \$1.5 to \$15 million.”
- The expense of e-business doesn't stop at implementation. Industry surveys and studies repeatedly show annual maintenance costs ranging from \$750,000 to \$4 million.”
- “A large manufacturer with many product lines and an advanced distribution network could easily pay up to \$15 million to purchase, implement, and integrate an e-Commerce package with primary systems. The implementation of e-Commerce throughout the distribution network could quickly exceed \$100,000 per distributor.”

(United Process Group, 1 October 2004)
<http://www.hallsby.com/UPGcorp/cost.html>

- “Full blown customer relationship management systems (CRM) can cost millions of dollars.” (InformationWeek 09/18/00)
- “Large companies have the infrastructure and personnel to handle all transaction needs, but small businesses just don’t have the infrastructure in place.” (Future Banker, April 2001)
- “Large institutions, exchanges, hedge funds, big broker/dealers, and ECN’s implement FIX solutions. ..for small and mid-sized institutions or for the retail investor the cost is too high and the time required to implement and monitor such a connection is too intensive.” (Wall Street & Technology Magazine, April 2001)

Safe Worlds slashes the establishment and operating costs of e-business because the essential software is so simple and universal that it can be given away free of charge to be used on a low cost, pay-as-you-use basis. This is possible because Safe Worlds

COMMERCIAL IN CONFIDENCE

employs the atomic building block approach to system development. This can be done because Safe Worlds employs only one, logic standard.

- “The Gartner Group has found that ...pre-built e-business solutions can halve these costs and cut time by two-thirds by using a building-block approach.” (ComputerWeekly, e.businessreview, 10/00)

The Total Safe Worlds Solution

Safe Worlds is designed to help businesses of all sorts and sizes do e-business. Safe Worlds will however, be of considerable benefit to small to medium enterprises (SME) that now cannot afford to do e-business. The SME E-Commerce Forum (2002) sponsored by Australia’s Telstra, identified the following issues of concern to SME in Australia who are considering e-business. These problems affect SME everywhere:

- Affordability
- Security
- Training
- Online payments
- Business analysis and planning
- Privacy

On the question of:

- **Affordability** – Web-based e-business systems can cost millions of dollars – the essential Safe Worlds software will be given to users free of charge (FOC). Users will then pay for the system on a low cost, user-pays basis related to the financial transactions that they process through the system.
- **Security and privacy** – Web-based e-business systems cannot be made private and secure because they cannot be integrated and made interoperable. Because of its atomic (Universal Logic) structure, Safe Worlds can deliver optimum privacy and security to every user.
- **Training** – Web-based e-business systems are complicated and therefore difficult to use. Most require extensive training before using and this is an on-going requirement because these systems are forever changing. Safe Worlds will considerably reduce the cost of training users because it simplifies the business process and eliminates the need for continuous system changes. This is possible because Safe Worlds is based on Universal Logic (the ULL) that is intuitive to most people and common to every application, and never changes.
- **Business analysis and planning** – Because Web-based e-business systems are not fully integrated and fully interoperable, they are very costly to configure to provide critical business analysis, budgeting, and planning information. Because Safe Worlds is fully integrated and fully interoperable, it can provide users with real time feedback on what is happening in their business and the tools they need to better plan and analyse their businesses, at a cost they can afford.
- **Online payments** – Many Web-based e-business systems are now connecting to online payment systems. However, because these systems are not fully integrated and fully interoperable, they do not offer the real potential of

COMMERCIAL IN CONFIDENCE

integrated e-payments. Safe Worlds integrates online payments with the entire e-business process and not just part of it.

Best Business Practice

The generic version of Safe Worlds is a best business practice platform, designed to enable an ordinary small business to establish and operate electronically. The common platform design of the Safe Worlds can be adapted to any business of any size. It comprises:

1. Software that creates a randomly encrypted virtual private network (VPN) for every user;
2. A Common User Interface that can be used as a single point of control for the operations of any business; and
3. A Semantic Database structure that can be adapted to any business.

The common Safe Worlds platform is designed to deliver the following generic capabilities:

- Single Sign-on (SSO);
- Wizard control installation and operation;
- Federated networking of customers and suppliers;
- Catalogue creation for any purpose;
- Inventory control;
- Global, group, and local database semantic searching;
- Fully integrated, fully interoperable business management
 - Real time dashboard feedback
 - Budgeting, costing, etc.
 - Integrated e-payments
 - Accounting for taxation
- Private and secure communications
 - IPTV
 - Instant Messaging (Chat)
 - IP Phone (like Skype) – video is coming
- Diaries
- Name and Address Book

Safe Worlds and Monetization

Safe Worlds is the standard for monetizing products and services in cyberspace on a global scale that is applicable to any business based on financial transactions. The world needs such a standard before e-business can happen.

- "The virtualization of physical money into its digital counterpart and the comprehensive diffusion of on-line financial services are likely to trigger the adoption rate of business-to-business and business-to-consumer routines over the Internet considerably." (Hawaii International Conference on System Sciences – 2001)

COMMERCIAL IN CONFIDENCE

- “Murdoch, chairman and CEO of News Corp., told attendees at McGraw-Hill's 2007 Media Summit here that while he finds YouTube "hypnotic," he questions whether the company can generate big advertising revenue. How do you monetize it, asked Murdoch?" (CNet News, January 2007)
- “The standard must be able to rapidly adapt to new business requirements and be affordable to not only the Global 2000 but also the small and medium sized enterprises.” (Tim West, E-Bill Magazine, April 2001)
- “The creation of a universal EBPP (electronic bill presentation and payment) solution requires universally accepted standards. A standard will speed business. The question is, which standard will lead the way.” (E-bill magazine, April 2001)
- Banks have long understood that “in a utopian world, from a consumers perspective, the goal of EBPP should be to have the capability to deliver any bill to any customer, anywhere, at anytime.” (E-bill magazine, April 2001) \
- “For EBPP to fly, financial institutions need to improve the technology.” (Bank Systems and Technology Magazine, April 2001)
- “ACH (the banking system’s automated clearinghouse network) moves money very efficiently – the main reason so many persist in using it – but only a limited amount of data can accompany each transaction. It can therefore be very difficult for a B2B customer to track exactly who is paying them, or what they are paying for. When only part of the purchase value is being transferred, which is often the case in the B2B arena the problem becomes even more complex.” (Paul Walsh, Clareon Corporation, AFP Exchange, February 2001)

To provide users with all the information they need to account for their online transactions, Safe Worlds provides a unique way to monetize products and services and simplifies and fully integrates the e-payment process.

- “Effective online procurement systems require a great deal of integration and process re-engineering before lowering costs. While many organizations frequently make purchases online, very few have taken the steps to enable efficient processing of those online purchases from a payment and accounting perspective.” (Jason Klemow, Seurat Company, AFP Exchange, February 2001)

Safe Worlds solves the problems of the dot-com crash

The inability to create fully integrated, fully interoperable systems caused most e-businesses launched during the dot.com era to fail.

- “AMR Research analyst Louis Columbus told the E-Commerce Times that dot-com mania brought integration to center stage. ‘Integration is king. That was a huge lesson,” he said. “Enterprises found that to develop a comprehensive e-commerce strategy, their applications had to work together seamlessly (but they couldn’t).” (Teri Robinson, Lasting Benefits of the Dot-Com Bubble, E-Commerce Times, 07/15/02)
- “During the boom years, everyone was so focused on "best of breed" vertical tech companies that focused on one area in particular. Everyone trashed companies that tried to provide complete integrated offerings. Things have changed. Now, with so many companies struggling, we're seeing more attempts at consolidating

COMMERCIAL IN CONFIDENCE

(integrating) complementary products to bundle them together and offer a complete "solution". The story five years ago was that only the best of breed players could adapt fast enough to keep up with the market. The truth is that most of the best of breed options created a huge integration mess that never worked.” (Techdirt, 14 October 2003) <http://techdirt.com/articles/20031014/0851234.shtml>

Competition

There is strong momentum behind the various initiatives of the XML and Web Services communities throughout the world to solve the problems of integration and interoperability - collaborative efforts like the W3C (<http://www.w3c.org>), WS-I (<http://www.ws-i.org>), and the Liberty Alliance (<http://www.projectliberty.org/>) are working hard and investing heavily in this effort. However, there is no real unity between these efforts and no workable solution from these endeavours is yet in sight.

The W3C's effort has been extensively explained in this document.

The Liberty Alliance is an organization of major IT companies focusing on the short term need for single sign-on (SSO) to solve the problems of user authorization and authentication. It acknowledges on his Web site however that:

- “At the core of the Web services revolution is the concept of identity management and the market's need for a global standard that is open, interoperable, and decentralised. In addition, it must allow for privacy safeguards across all markets.” (The Business Benefits of Federated Identity, Liberty Alliance.)

IBM Corporation is also heavily involved in this effort.

- “Artificial Intelligence research at IBM today is at the forefront of many of the hottest areas.”
- “We are particularly interested in synthesizing (integrating) technologies, whether combining AI methodologies or integrating AI techniques with other technologies.”
- “Our focus is on using artificial intelligence (AI) to solve challenging technical and commercial problems, and to advance the state-of-the-art in many areas, such as electronic commerce, supply chain management, autonomic computing, and exploratory vision.”
- We are examining the ways in which a knowledge of basic common-sense facts and an ability to reason with those facts can enhance interaction with automated systems.”

(IBM Web Site, www.ibm.com 2004)

Autonomic Computing

IBM calls its effort at creating an interoperable system, “autonomic computing”. It is modeled on the way the human autonomic nervous system works. It is however, just another word for semantic computing

COMMERCIAL IN CONFIDENCE

Paul Horn, the VP of research at IBM has called autonomic computing “the grand challenge” now confronting computerization.

In their effort to create autonomic computing (the Semantic Web) some IBM scientists question if they can achieve their goal without artificial intelligence? In an IEEE approved document, IBM scientists Kephart and Chess ask:

- “Is it possible to meet the grand challenge of autonomic computing without magic and without fully solving the AI problem?” “We think it is,” Kephart and Chess say in their paper “The Vision of Autonomic Computing,” “but it will take time and patience.”

My experience in designing Safe Worlds is that autonomic computing cannot be achieved without the artificial intelligence inherent in Universal Logic.

- Autonomic computing is described as: “Systems that manage themselves according to an administrator’s goals. New components integrate as effortlessly as a new cell establishes itself in the human body. These ideas are not science fiction but the elements of the grand challenge to create self-managing computer systems.”
http://www.research.ibm.com/autonomic/research/papers/AC_Vision_Computer_Jan_2003.pdf

Oracle and Fusion

Although not spoken of in terms of an attempt to create a Semantic Web, Oracle has spent a fortune (estimated in the vicinity of \$35 billion) over some 10 years to create what is called Oracle Fusion Middleware (OFM).

Unlike the single Safe Worlds system, OFM is a portfolio of software products, produced by Oracle that spans multiple services, including J2EE and developer tools, integration services, business intelligence, collaboration, and content management.

Oracle Fusion Middleware is designed to support development, deployment, and management of Service-Oriented Architecture. In January 2008, Oracle Universal Content Management won InfoWorld's *Technology of the Year* award for "Best Enterprise Content Manager", with Oracle SOA Suite also winning the award for "Best Enterprise Service Bus". In 2007, Gartner said "OFM has reached a degree of completeness that puts it on par with, and in some cases ahead of, competing software stacks".

The big difference between Oracle Fusion Middleware and Safe Worlds is that OFM is not a single universal e-business platform that can be applied to move the whole world into cyberspace. Oracle does not have Universal Logic. OFM is also a very expensive and complicated system that is not really suitable for small business. Oracle’s investment in Fusion is too great to be able to afford to give the software away for free, as we can with Safe Worlds. It is doubtful therefore that OFM will ever be competitive with Safe Worlds.

Microsoft and .NET

Microsoft is also very active in the e-business arena and is heavily involved in the effort to create a fully integrated, fully interoperable global e-system. Microsoft's effort is focused on what it calls .NET technology. Somewhat like Oracle Fusion Middleware:

- “Microsoft® .NET is a set of software technologies for connecting information, people, systems, and devices. This new generation of technology is based on Web services - small building-block applications that can connect to each other as well as to other, larger applications over the Internet.” (www.microsoft.com)

As popular as .NET has become, it is nothing like Safe Worlds and really cannot be considered to be a direct competitor.

Google and Semantic Search

Google is another of the big names that is trying to break into e-business. However, Google has not yet revealed that it has anything like Safe Worlds.

Semantic Search is another one of the big benefits that will come out of creating the Semantic Web and this is where Google's main interest in semantic technology now appears to lie.

- “Semantic technology has great promise to improve search.” (Riza C. Berkan, Hakia, 2008)

Safe Worlds now delivers Semantic Search. Others are certainly also trying to develop Semantic Search, but without Universal Logic it is not easy.

- “Google's engineers are not idly watching semantic search from a distance, says Norvig. The company's thousands of engineers are looking at how to incorporate semantic analysis into a search algorithm.” (Forbes.com, February 2008)
- “Google's Peter Norvig, the search giant's director of research, knows just how complex semantic algorithms can be: His Berkeley Ph.D. thesis tried to develop one in 1978. Every sentence of text, he says, took weeks to analyze. "The result was kind of like a dancing bear," he says. "It was amazing that it could dance at all, but we didn't expect it to star in the Moscow Ballet." (Forbes.com, February 2008)
- “Google certainly doesn't have a monopoly on good ideas, and no doubt someone could develop a Google-killer. But I'll bet that any real success will come from someone that is also devoted to solving problems of users, not showing off any one innovation from the labs.” (Riza C. Berkan, Hakia, 2008)

Companies like Powerset, Hakia, Cognition Search, and Lexxe are trying to develop Semantic Search technology, but none of these have Universal Logic either.

Microsoft bought three-year-old start-up Powerset in July 2008.

COMMERCIAL IN CONFIDENCE

Yahoo is also in the race to develop Semantic Search. Yahoo's director of product management, Amit Kumar said in his blog recently that Yahoo will begin supporting Semantic Web standards.

E-business Confusion

Apart from these efforts however, the rest of the IT industry is in obvious confusion when it comes to e-business, as the US NIST acknowledges:

- “The state of the art in enterprise engineering and integration is rather confusing. On the one hand it claims to provide solutions for many of the requirements in enterprise integration. On the other hand the solutions seem to compete with each other, focus on particular issues, use conflicting terminology and do not provide any clues on their relations to solutions on other issues.” (US National Institute for Science and Technology – current)

In other words, the systems available today are not integrated. The use of the words integration and interoperability by the computer industry can generally be described as hype.

XML and Web Services

Without Universal Logic, the IT industry is now basically reliant upon XML and Web Services. But, unlike Safe Worlds, all XML based application and Web Services are limited in what they can do.

- “The enthusiasm surrounding Web Services is based on the promise of interoperability,” Stephen Potts and Mike Kopak, say in their best-selling book on Web Services in 24 Hours, published in May 2003. “If we take off the rose-colored glasses for a minute, however, we will see that there is much work to be done before this promise is realized.”

This was confirmed by Jim Hassel, MD of Sun Microsystems, Australia and NZ, when asked in an interview that appeared in CRN Magazine published on 18 October 2004:

- “(Web Services) is a way to deliver some business functionality over the Internet, within one business or across many,” Hassell said. “A Web services problem has been interoperability.”

How do Sun plan to resolve this issue?”

- “The ability to implement global Web services is dependent on the advancement of WS-I (Web Services Interoperability) standards that will enable global Web standards.”

In other words, the members of WS-I are still waiting on WS-I for a solution.

- “The Web Services Interoperability Organization (WS-I) is an open industry effort chartered to promote Web Services interoperability across platforms, applications, and programming languages. The organization brings together a diverse community of Web services leaders to respond to customer needs by providing

COMMERCIAL IN CONFIDENCE

guidance, recommended practices, and supporting resources for developing interoperable Web services.” <http://www.ws-i.org>

The US National Institute for Science and Technology Web site confirms this: <http://www.mel.nist.gov/workshop/iceimt97/pap-kk1/pap-kk1.htm>

- “Current information technology does not yet provide a complete solution for enterprise modelling and its use in the day-to-day operation by the operational staff is still limited. In addition, application of existing enterprise integration technologies has been hampered by a lack of business justification, a plethora of seemingly conflicting solutions and terminology, and by an insufficient understanding of the technology by the end-user community. These barriers inhibit, or at least delay, the use of relevant methods and tools in the industry, especially in small-to-medium-sized enterprises (SMEs).”

NIST says that, “there are three major groups of issues that need to be addressed and resolved in enterprise integration:

- The lack of an accepted common base (platform) in the research community,
- Limited awareness in the user community of the big picture, and
- Insufficient information technology support.”

The European Union’s 2003 Working Paper on enabling seamless e-government, “Linking up Europe: the Importance of Interoperability for e-Government) supports the NIST position:

- “Information systems today are not interoperable.”
- “Interoperability is a fundamental requirement, from both the economic and technical perspectives.”
- “Failure to put in place interoperable e-government systems will have both economic and social costs.”
- “No significant productivity gain will be achieved by implementing e-government services that simply replicate existing paper-based systems.”
- “Without interoperability, both within and between the public and enterprise sectors, electronic ways of working are bound to fail.”
- “The technology just isn’t there yet. The full potential of the Internet has yet to be realized.” (Judy Sprieser, Transora, Future Banker Magazine, April 2001)
- “It is one thing to advocate widespread data sharing; achieving it is another.”(MIT Technology Review, March 2003)
- “Interoperability, designed to enable anyone anywhere, to do business with anyone else over the Internet, with little or no need for human intervention, will be difficult, if not impossible, to achieve.” (2003 EU Commission’s Working Paper on enabling seamless e-Government: “Linking up Europe: the Importance of Interoperability for e-Government)

Safe Worlds First to Market Advantage

Because Safe Worlds is fully integrated and fully interoperable, and is now commercially available, I believe that Safe Worlds has a significant first-to-market advantage.

The difficulties that competitors are now having finding Universal Logic will not be easily overcome. Anyone who finds Universal Logic can then expect to work for at least the next 3-5 years before they will have a system like Safe Worlds.

- "The difficulty in developing and implementing autonomic computing is daunting - enough to constitute a Grand Challenge." (Paul Horn, VP Research, IBM Corporation, October 2001)
- "In order to come up with machines that have the same kind of abilities as humans, we have to do a huge amount of analysis of what it is to be a normal human being." (Professor Aaron Sloman from the University of Birmingham, BBC interview, 2004)
http://www.open2.net/nextbigthing/ai/hear_the_arguments/arguments.htm
- "If you look at what we have achieved, at what systems we have that seem to be intelligent, we don't have systems really. We don't have anything that is a whole intelligent system. (Dr Amanda Sharkey, University of Sheffield, BBC Open University interview, 2004)
http://www.open2.net/nextbigthing/ai/hear_the_arguments/arguments.htm
- "To develop the artificial intelligence of the future, people in AI laboratories are now looking at the mechanisms of the brain and the way they learn, evolve and develop intelligence from a sense of being conscious." (Professor Igor Aleksander, Imperial College)
http://www.open2.net/nextbigthing/ai/hear_the_arguments/arguments.htm

Safe Worlds and Artificial Intelligence

To be semantic, a system must also be artificially intelligent.

Safe Worlds uses artificial intelligence to automate the processes of e-business. However, it does take humans out of the process of e-business. Safe Worlds is not an attempt to create a machine that is conscious like a human being. I do not believe this is possible because of inherent limitations in Universal Logic that prevent this.

Current Status

As of the date below, Safe Worlds is now being systematically commercialized. The system has finished Beta Testing and will now be control released over the next 12 months.

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