THE STANDARDS EDGE:

Future Generation

2005

EDITED BY SHERRIE BOLIN

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Preface

Sherrie Bolin

Editor in Chief, *The Standards Edge*™ Series
The Bolin Group

The Standards Edge: Future Generation marks the fourth book in *The Standards Edge*™ series. This book was created to help the builders of the Future Generation of Information and Communications Technologies (ICT) find common ground so that they can work together effectively to bring about tomorrow's technologies. As with the other books in this series, this volume was produced in concert with an international conference, which focused on the technical, social, legislative, and academic aspects of the Future Generation. The conference brought together representatives from all of these communities to explore strategies for using standardization to effectively build the Future Generation. For a full analysis of the conference, please visit **www.thebolingroup.com**.

The Standards Edge series is designed to tackle the latest technological and standards issues and their impact on business. These volumes serve as a valuable resource to industry, academia, government organizations, standards setting organizations, and information and communications technology (ICT) customers worldwide. Future editions will cover other topics in-depth that pertain to both ICT and standardization. Feedback, suggestions, and requests for additional copies can be sent directly to the creator and editor of this series by sending email to **sherrie@sbolin.com**.

The Standards Edge: Future Generation was made possible through the assistance of many organizations and individuals. A special thanks goes to Sun Microsystems and its Chief Technology Officer and Executive Vice President, Greg Papadopoulos, for providing a research grant that allows this objective look at the Future Generation. The authors in this book are respected experts in their fields. Relying on their extensive experience in their respective areas, they each bring critical and unique insight about what is needed to build the Future Generation. These authors, despite their incredibly busy schedules, have donated their time and expertise to making this book successful. To them, I give my utmost thanks, appreciation, and, above all, admiration.

The team that works to bring together this series grows annually. With the addition of each new person, we wonder how we ever got along without them. Andrea Young joined the team this year as project coordinator. Her talent for diplomatic persistence is unparalleled and sincerely appreciated. Katherine Downey also came on board to help produce this book. Her expertise in the use of the English language coupled with her knowledge of the technology industry has proven invaluable. Laura Shelley, as always, is an essential part of the team. Her talents as copy editor and indexer are matched only by her enthusiasm. She always has her eye out for just that right author or topic that might add a unique aspect to the books. To Laura, I extend my hearty thanks. Laura Rinaldi is the expert behind the design and layout of the book. It is rare to find someone who is not only visually creative, but has the technical expertise to turn an idea into reality. To Laura, I give my thanks and respect.

Finally, I would like to thank my longtime friend, Jamie Wheeler. Everyone should have a real hero in their lives; not the kind that wears capes or leaps tall buildings in a single bound, but the kind that lives life to its fullest, doggedly overcoming its challenges to achieve greatness. Jamie is my hero and it is to her I dedicate this book.

Introduction

Sherrie Bolin
Editor in Chief

She followed the aroma of roasting coffee downstairs. Though her eyes were barely open, rooms lit up as she entered them, darkening again upon her exit. Preparing her first cup of coffee of the morning, she grabbed the nearly empty container of milk, failing to take note of it. She instructed the back door to open, letting the dog out for his morning romp, while she turned to making breakfast. She removed two eggs from the refrigerator, ignoring the almost inaudible beep signifying the adjustment of the egg count. The screen on the refrigerator displayed her schedule for the day, noting that the appointment with her largest client had been changed and that subsequent meetings had been rearranged to accommodate this high priority appointment. While she ate breakfast, she read the news—automatically filtered according to her past reading preferences, her occupation, her hobbies, and even her health concerns—displayed on a wall screen in the breakfast nook. Meanwhile, noting that rain was imminent, her closet rotated her raincoat and umbrella to the front. A taxi was automatically ordered for 8:35, giving her the exact amount of time she would need to make her first meeting downtown given the weather and traffic conditions. Responding to a signal letting her know the taxi had arrived on her block, she threw on her shoes, strapped her computer onto her wrist, grabbed her rain gear, and exited just as the taxi arrived.

Upon returning home that evening, she stumbled over a collection of boxes unexpectedly piled on her porch. Looking at the labels, she noted that apparently 3,000 of her husband's favorite razors had been delivered to her home. Turning her eyes to the top of the porch where the sensor scanned her irises she heard the deadbolts unlock and entered the house as the door opened automatically. Heading upstairs, she noted the medicine cabinet proudly displayed a message stating that the razor blade order—set to occur automatically when the blade started to become dull and the supply was running low—had been completed. Indeed, 3,000 instead of the preferred three razor blades had been ordered, suggesting once again the need for reprogramming. Heading downstairs for a cup of tea, which had

automatically started brewing when she came home, she reached into the refrigerator for the milk. Noting that it was empty, she went to the grocery delivery box outside, which was also, disappointingly, empty. Quickly sending a note to the store that had reliably delivered her groceries for five years, she discovered that the refrigerator's milk order had failed. An error test indicated that her new refrigerator's sensing system was unable to interoperate with the ordering system of the area's stores without additional software.

Sitting down to enjoy her tea without milk, the screen in the breakfast nook flashed an advertisement for a hotel in Cancun and then a commercial on the same subject followed. She had recently booked a flight to Cancun and advertisers, keying into her flight schedule, calendar, and credit limits, were constantly presenting travel bargains despite the latest incoming message controls that she had painstakingly installed. The screen then showed advertisements from competing razor companies, who had noted her recent order, offering her samples of their products. She instructed it to stop playing the advertisements and turn on the news, but the ads kept appearing over and over again. Frustrated, she exited the room and picked up the phone to commiserate with a friend. Although she told it to dial her friend, the phone, recently infected with a virus, froze after dialling the first three numbers. At that point, a loud beeping sound indicated that her blood pressure was up and a computerized voice instructed her to pursue a relaxing activity. And so unravels the day of a typical modern worker of the Future Generation . . . .

The Future Generation of information and communications technology—the dynamic and, hopefully, secure internetworking of things and people—promises to heighten productivity while allowing us to spend more time enjoying life. A vision in which the tools in our lives internetwork seamlessly to automate many of our daily tasks is enticing and may even be achievable. After all, the scenario described above is based on technologies that exist today, albeit at a limited and often cost-prohibitive level.

There is a fundamental difference between the technologies used today and the ideal technologies for the Future Generation. If we are going to be surrounded by a plethora of technology—whether those technologies exist separately or are integrated into our buildings, appliances, and even our clothes—then they must be reliable, must interoperate seamlessly, and must automate updates and repairs. These criteria are no different from the ones we look for in technology today but often do not receive. While we can grudgingly afford to devote significant maintenance and repair time to our relatively few devices today, the costs of carrying this practice over to the many technologies in the Future Generation would be astronomical. After all, the advantages of using technology to increase productivity quickly diminish when maintaining that technology becomes more time-consuming than the original task.

Since technology is fundamentally about communicating—whether between people or between devices—the means for achieving this also need to be addressed. Currently, humans must be computer-literate; we must adapt our behavior to communicate with technologies. For our computers, we must use a keyboard and a selection of mouse devices. For our PDAs, we require a stylus. And for our phones, we must use touch and scroll to select the options we want. Ideally, we will be able to interact with technologies through our preferred means at the time, whether through touch, voice, or even eye movement. In other words, computers will become human-literate. The foundations for this ideal are being built today but are currently limited to predefined structures that do not mirror real-life human interactions. For example, while we are certainly making progress in the voice interaction arena, it still confines us to answering predetermined questions followed by multiple-choice answers rather than being able simply to state what we want. In the Future Generation, one can only hope that this era of automated phone trees that seems to have sprouted innumerable branches will have quietly withered under the onslaught of advanced semantic capabilities. Instead, we will be able to interact with technologies through a variety of different means, which will make us more productive. They will also allow people who currently have difficulty using technology due to physical, cognitive, or financial differences to cross the digital divide.

Realizing this vision, however, will take more than developing cutting edge, reliable technology. It will require an internetworking of the people and organizations that have impact on how the Future Generation

of ICT is developed, deployed, regulated, and used. ICT vendors, governments, academics, users, and those dedicated developers who create technology "just for the fun of it" all play key roles in bringing the Future Generation to market successfully. The first challenge is to facilitate communication among these groups in a way that not only overcomes differences in native languages, but also in industry languages. One only has to sit in a room with professionals from the telecommunications industry and those from the technology industry to realize that differences in terminology alone are enough to derail earnest efforts to collaborate. The second challenge is to make collaboration attractive enough to motivate individuals and organizations to compromise on self-interests in the hopes of gaining greater rewards. Finally, we must develop new models of collaboration, or customize the old ones, for the needs of the Future Generation. These models should take advantage of technology to make participation in collaborative efforts more affordable and convenient by minimizing travel and providing alternative means of communication. And, they need to provide new ways for people to collaborate, perhaps by developing alternative or more flexible processes, revisiting organizational and national policies, or exploring innovative business models that embrace collaborative efforts and technological advances.

In searching for these new models, we might first look to existing ones that can be modified. Standardization has traditionally served as a mechanism for collaboration and its models vary according to the needs of the standardizers and the technologies concerned. But standardization is facing significant challenges that may impede its efficacy in this new arena. As it has increasingly become recognized as a strategic tool for impacting markets, control over standards activities has shifted from the hands of the technologists to those more concerned with creating a competitive edge. Some argue that more timely production of standards that better meet market needs occur as a result, while others believe that technology is suffering. Regardless of the differing opinions, one result is clear: a fragmentation of standardization efforts, caused by competition between the standards setting organizations (SSOs) themselves and supported by vendors willing to jump to the SSO that offers the most advantages at the time. In an ironic twist, this behavior is undermining standardization efforts by ignoring the very advice SSOs give their members—collaborate now to receive greater rewards later on.

Standardization, however, is neither a dying industry nor an archaic institution. On the contrary, the down turn of the economy spurred by the Internet bust, coupled with increasing globalization, has made SSOs more business minded and attuned to market needs. There are those working to strengthen the system by developing innovative processes, reaching out to new types of participants such as users, and bravely facing issues that threaten to undermine standardization such as intellectual property rights. To help build a solid foundation for designing collaborative models for the Future Generation, we can look to past standardization models that have been successful in bringing new and disruptive technologies to market and we can examine innovative approaches SSOs are currently testing.

This book takes a look at the Future Generation of information and communications technology and what we need to do to bring it to fruition successfully. It begins by examining just what the Future Generation might look like from a higher level and then delves down to view it from more specific technological levels in "A Look into the Future." At the core of the Future Generation will be the key players involved. "Tomorrow's Builders Today" presents the viewpoints of those different players, analyzes their requirements, and explores ways to meet those needs. A central issue in the Future Generation will be control. Not whether control will exist, but rather who will have that control over aspects such as personal data, security parameters, and even

intellectual property rights. In the section "Who's Got the Power?" we consult the experts in some of these areas to find out their views on where that control should lie and how to manage it. To examine standardization as a collaborative model, we look at two sections. The first, "Standardization at a Crossroads," paints a realistic, though sometimes surprising picture, of where standardization is today. This is followed by "Catalyst for Collaboration," which looks at standardization models, both past and present, to generate ideas on how standards can evolve to serve as an effective collaboration mechanism for the Future Generation.

The name Future Generation can give us a false sense of security. It implies that it has not arrived, we are not affected by it, and that dealing with it is a task that can be shuffled to the bottom of our "To Do" box. But it has arrived—at least in bits and pieces. It is up to us to determine if those pieces will be cobbled together in a haphazard fashion with little regard for how they impact individuals and businesses, or, whether we will collaborate to help create a Future Generation of information and communications technology, with the laws, business practices, and body of knowledge to support it. We have the opportunity to build a Future Generation that actually does what it is intended to do: enhance, not encroach, on our daily lives. It all depends on how you want your future to unravel. Is that your blood pressure alarm I hear beeping . . . .

A Look into the Future

Sherrie Bolin

Editor in Chief

Section **1**

What does the Future Generation of information and communications technology look like? Take a moment to put on a pair of virtual glasses and peruse the articles in this section to find some interesting answers to this question. Leave your preconceptions behind as you let the authors take your imagination on a journey to the future.

Common to most of the authors in this section is the need to approach the Future Generation from the user point of view. Technology should integrate into our daily lives, migrating from a collection of disparate devices that take up space in our homes, our business, and our lives, to become a network of connected capabilities that sit unobtrusively in the background. Underlying this will be the need to manage the complexity that can exponentially increase as technology advances. Standardization is posited to play a key role in this area as both a collaborative mechanism and a means to facilitate interoperability. The solutions for achieving these goals vary by author, though their ideas are not as fundamentally different as one might think given the variety of industries in which they work.

Balaji Prasad paints a high-level view of what the future will entail when the network, due to its pervasiveness, almost disappears. At the heart of the Future Generation will be a fundamental shift in development methodology from a push to a pull model. Today, marketers determine what users want as a whole and then push products on the market to meet these needs. They spend more time positioning the product for different markets than on customizing the actual technology to meet different user requirements. With the pull model, users will pull technology from vendors to meet their individual needs, perhaps even meeting those needs dynamically as their situation changes. Hartmut Raffler pictures a world filled with ambient technology in which agents automate many of our

daily tasks. He emphasizes the need for human-literate machines and Claus Hohmann supports this concept in his article. As chief technology officer of Volkwagen's renowned theme park, Autostadt, Hohmann is the expert in designing user experiences that tune into the natural way that humans interact with technology. Even though these authors come from different companies, EDS, Siemens, and Volkswagen respectively, their visions for the Future Generation share common elements. The terminology is different as is apt to happen across industries, but perhaps a shared vision will create enough common ground for multiple industries to collaborate successfully.

Although the network will "disappear," allowing us to take it for granted just as we do the telephone network today, the way that network is designed and operates will determine just how effective and easy to use the Future Generation will be. To begin with, according to Greg Mumford and Brian McFadden, there must be agreement on the terminology and principles for this network. Following that, gaps and overlaps should be identified across standards organizations in an effort to keep development moving forward rather than fragmenting into competing camps. Authors from BT describe their vision of the next generation network, particularly in regards to transport protocols. Mike Walker of Vodafone discusses how 3G should evolve not only for technical efficacy but to sustain European leadership in the wireless area. His article illustrates an important point: competition in the Future Generation is not just between companies or even between SSOs, but between nations and regions as well. Managed correctly, this competition can spur innovation and drive down prices for consumers. The challenge is to nurture this competition while allowing a level of global standardization that helps businesses to meet local market requirements and regulations more effectively. Completing this brief exploration into Future Generation

technologies is S.J. Camarata, chief strategist at ESRI. Geospatial information has always been a critical part of the way we view the world and organize information. This article looks beyond the mapping and GPS abilities that we have come to rely on and even take for granted to a more prominent role for this collection of technologies: data integration. Since almost all information has a geospatial element, including location, Camarata proposes that this type of information can serve as the unifying element to facilitate interoperability and manage complexity.

Of course, while the Future Generation can potentially benefit humankind, its development and deployment must have solid business value. Without the ability to monetize Future Generation technologies, the pace of development would slow and concentrate in those areas of interest to technologists willing to devote their time and resources. Fortunately, monetization opportunities are evident and appear to be numerous for those businesses with the foresight and ability to adopt innovative business models. The final article in this section explores those present and emerging opportunities and discusses what vendors need to do to profit in the long run.

The vision painted in this section is intended to stimulate your imagination, to serve as a launching point for your own explorations into the possibilities of the Future Generation. Regardless of whether you agree with the authors, understanding their visions will help to create the common ground critical to stimulating successful collaboration as we all move forward.

Tomorrow's Builders Today

Sherrie Bolin
Editor in Chief

Section 2

When you get in your car and turn the key, do you wonder if the oil system will work, whether your steering wheel will be able to interact with your tires, or if turning on your headlights will short out your electrical system? As you drive down the road, do you have to spend a significant amount of time interpreting every road sign? Do you worry that the size of the lane will change so much that your car will no longer fit in its allotted space or whether the bridge you are crossing will hold your car's weight? As your gas gage signals empty, do you have to spend time looking for the gas station that carries the right size nozzle for fueling your car? Do you need to spend time researching the different types of fuel to ensure that it will work with your specific vehicle?

If you answered "no" to all of these questions, then you are the beneficiary of a well-run transportation network. This network, in all of its complexity and advancing technologies, works so reliably that we often take it for granted. Sure, the car may need to go into the shop occasionally or we may be tied up in a traffic jam due to road construction, but for the most part we assume that our car and the network that supports it will work reliably. Most importantly, we believe that it will serve its intended function: transporting us to our desired location. And this applies not only to the automobile infrastructure, but to other types of transportation networks such as trains and airplanes.

The next time you are driving down the road listening to your favorite radio station take a moment to think about who is responsible for all this convenience. This network was not just built by technologists or a single industry. Instead, it took collaboration from automakers, the oil industry, government, private businesses, academia, standardizers, and, of course, the actual users, among others, to make this network run efficiently and in a relatively short period of time. Similarly, the Future Generation will require this level of collaboration among all those involved to build a network of technology that fulfills its intended use in such a way that we can take it for granted.

With technology increasing its impact on virtually every facet of our lives, and threatening to surpass the complexity of today's transportation systems, the evolution of the Future Generation of ICT will necessarily be a group effort. This is not to say that it all should be designed by committee. There is plenty of room for those rugged individualists who imagine possibilities that leave the rest of us scratching our heads and brilliantly replying, "Huh?" But the Future Generation impacts and will be impacted by far more than technological constraints and capabilities. Laws, societal needs, business requirements, and academic findings will all play key roles in how the Future Generation develops. Governments, users, standardizers, businesses, academics, and technologists—these are the builders of the Future Generation. The key is to figure out where and how to involve them in the process. This section looks at these different builders and discusses just how they can or plan to take part.

The first group we look at are the users of the Future Generation. As seen in the previous section, the popularity of actually taking user requirements into account is rising. This is a large change from several years ago when this series first started. Then the suggestion to involve users in the development process was ridiculed. So, just what do users want? The answer depends, of course, on the user, often at the time of the asking. To understand just how user requirements can vary, even within a family, read the article by Michelle and Christopher Aden. This discussion between mother and son highlights generational differences in areas such as technology, intellectual property rights, and monetizing the Future Generation. Anne Clarke's article follows,

calling for a socially inclusive system for the engineer-
ing paradigm. She advocates considering the social
implications of technological change and describes the
elements that would ideally be present in this type of
system. Pierre-Yves Hébert describes user requirements
for the Future Generation and looks at how standards
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Who's Got the Power?

Sherrie Bolin

Editor in Chief

Who's got the power over the Future Generation? Should it be controlled? Is it even possible to control the Future Generation or at least certain aspects of it? If so, who should be in control? Though these questions might seem a bit far-fetched, a bit Orwellian perhaps, they reflect debates that are occurring today. Topping the list are evocative issues such as security (both national and technical), privacy, and intellectual property rights. Technological advancements can threaten these areas or strengthen them, depending on how they are used. And that is the ultimate issue. Technology can gather user information for providing more conveniences or steal identities, protect a computer or invade it, and provide a legal means to monetize intellectual property or a way to gain unauthorized access to it for free. Technology is simply a tool and its function depends on who is using it at the time. So, when we talk about control, are we talking about control of technological advancements or of how we use that technology?

Each of the Future Generation builders who were discussed in the previous section will obviously have their own ideas about who should be in charge and why as technology advances. Chances are their opinions will vary depending on the technology in question, the situation, and the trade-offs between risks and rewards. For example, many consumers willingly provide information on their shopping preference in exchange for store discounts, but they balked when they discovered that RFID tags placed in razors might track product use in their homes. Similarly, consumers give up a great deal of privacy at airports—allowing their luggage and even themselves to be searched—in exchange for safety. But, how will air travelers feel if other information is used to prescreen passengers such as their travel history, credit report, and bank account balance? The rewards in the form of airline safety are the same, but there may come

a time when the rewards of personal privacy outweigh that of personal safety.

This section examines some of the issues highlighted by the Future Generation and examines the prospect of control in each of these areas. To begin, we look at a technology that has become a mainstay in many of our lives—the Internet. In his article, Andy Updegrove discusses the question of Internet governance as it plays a greater role in both society and the global economy. Privacy, as previously mentioned, is taking on increasing importance as technology advances. Some advocate having complete control of their personal data while others proudly proclaim that "Privacy is dead." Frederick Lane explores the current status of privacy and discusses steps government and vendors can take to address this issue. If we are to protect our personal data, or at least control its dissemination, security becomes invaluable. Security issues rise in parallel with complexity, according to Dan Geer. This security guru, in his article, describes an innovative approach to managing this critical issue.

Technology has allowed new ways to distribute products and more convenient forms of collaboration to develop. This has facilitated sharing of intellectual property both willingly, as with open source software, and sometimes unwillingly, as with Hollywood's notorious fights to install control in technological devices. Again, this raises the question of whether control, if desired, should be integral to the technologies or part of the rules that govern our societies. Standardization often provides a middle ground for sharing intellectual property. It relies on licensing agreements, such as royalty-free or reasonable and nondiscriminatory (RAND), to facilitate intellectual property sharing among practitioners. Standards setting organizations also play a key role in making technologies interoperable. Thus, they may help to bring together technolo-

gies that can be used either to protect or to distribute (with or without permission) intellectual property. In addition, they help their members develop technology in a way that meets government regulations in this and other areas. Finally, they create their own intellectual property, which they may sell or distribute free-of-charge. Thus, SSOs play many roles in regards to intellectual property, and the solutions they develop to meet this challenge are many. For an understanding of just how much these solutions can vary, read the articles by Huang, Tong, and Reader; Stephane Tronchon; and Ray Alderman.

Privacy, security, governance, intellectual property . . . these are all critical aspects of the Future Generation. They can ignite power struggles or render innovative solutions. So, who's got the power? Who has or should have the control over the Future Generation? As Woodrow T. Wilson once stated, "There must be, not a balance of power, but a community of power . . ." For the Future Generation to evolve successfully, it will be up to the builders to establish that community.

Standardization at a Crossroads

Sherrie Bolin
Editor in Chief

Railroads were once viewed as a dominant economic force, stimulating entire industries, the building of new towns, and a mad rush to profit from them similar to that of the Internet boom. Towns solicited them, some prospering and others borrowing money in a vain hope that the railroads would ensure their survival. They transformed markets from local to national as they enabled the delivery of perishable goods across long distances. Standards arose to provide such conveniences as regularized time zones and regularized track gauges. Yet, despite all the enthusiasm, railroads lost their position as the dominant form of transportation. With the rise of interstate highways and airlines, they soon began to buckle under the competition. Though the reasons posited are many, one factor stands out: Railroads viewed themselves in the business of railroads, not in the business of transportation. When their only competition consisted of horses and canals, this was a luxury they could afford. However, when other alternatives became available, the pressure to meet user needs increased. Reliability, security of goods and passengers, cost reduction, scalability, and flexibility of delivery options were in demand. Though users had always desired these qualities, the emerging alternative forms of transportation now made them available. Railroads failed to realize this, securing their fate as a subordinate form of transportation in a multimodal transportation network.

Will standardization succumb to a similar fate as that of the railroad? Today, it faces a similar situation. Once riding the crest of the Internet boom, many standards setting organizations are now fighting for funds allocated to standards activities by government and vendors. Many have become so embroiled in this fight that they are actually fragmenting the market. As a result, the market must contend with competing standards that undermine the very goals of standardization: interoperability, safety, and quality. SSOs, however, are not solely to blame. Vendors, seeking the SSO in which they can wield the most influence, readily abandon one standards effort and establish a competing effort with another organization. Standardization is a business tool and, since business tools are ultimately used to make money, some degree of competition is expected and even healthy. However, when vendors and SSOs forget what business they are in and why they sought standardization in the first place, their efforts become irrelevant. Standards setting organizations are not in the business of creating standards, just as a railroad is not in the business of creating more railroads and a publisher is not in the business of creating books. These are means to an end. Standards can facilitate interoperability, ensure quality or safety, and build consumer confidence, among other things. But to achieve these, successful collaboration needs to occur. Standards setting organizations are in the business of providing collaborative mechanisms. And that service will prove indispensable to the Future Generation.

For the rest of the book, we look at standards from two different perspectives. This section examines where standardization is today. The next section provides recommendations for honing standardization so it can serve as the preferred collaborative mechanism for the Future Generation. Since authors for this series tend to focus on action and solutions, readers will find that recommendations for strengthening standardization could not be confined to a single section, but are to be found in articles throughout the book.

Andrew Russell begins this section by drawing lessons from the history of standards. He looks at how standards have been used to build industries and even helped to bring equality after the French Revolution. Jumping to the present, Deepak Kamlani presents a sobering view of international standardization. Painting truly global standards as an unachievable ideal,

Kamlani discusses the three geopolitical regions that dominate standards setting and the rivalry that contributes to market fragmentation. Alistair Urie gives us a more detailed view of the standardization process, providing an innovative model for organizing and strengthening standardization activities. There are many critical issues facing SSOs today. Keith Dickerson and Isabelle Valet-Harper, on behalf of the ICT Standards Board, take an in-depth look at some of these challenges and provide recommendations for overcoming them. Finally, Tineke Egyedi and Petra Heijnen examine standards dynamics and their stability over time. They question whether some aspects of standards can predict if a standard will be revised, replaced by a new standard, or be published as a new edition.

This combination of articles provides a realistic view of the current state of standardization. Though standardization has its challenges, they are not insurmountable. It is up to SSOs, and the vendors and governments that fund them, to decide where their value lies. Is it in the production of standards documents or in the facilitation of the collaboration critical to building the Future Generation? The answer they give now will determine whether standardization becomes a subordinate mechanism in the Future Generation or an indispensable industry.

Catalyst for Collaboration

Sherrie Bolin
Editor in Chief

Section 5

No man is an island, entire of itself; every man is a piece of the continent, a part of the main.

—John Donne, from "Meditation XVII"

The Future Generation cannot be successfully brought to fruition by technologists alone. Government cannot make it happen, nor can users. Academics, in all their wisdom, cannot create the Future Generation. None of these, acting as an island, can build the Future Generation as envisioned in the first section of this book. Rather it will be their collaborative efforts that create a Future Generation that truly and effortlessly serves our needs. What we need is a way to bring these builders together in a manner that allows them to work together towards tangible results despite differences in terminology, industries, and even cultures.

Standardization, if only through tradition, is positioned to fill this role. However, it cannot do this in traditional ways. Just as the Future Generation needs innovative approaches and a crossing of traditional boundaries, so do standards setting organizations if they are to succeed as collaborative leaders. In this section, we look at how some are creatively addressing this challenge.

To begin with, Andy Updegrove proposes that it may be helpful to think not of standards in the traditional sense, but of commonalities. As emphasized in the previous section, standards are a means not an end. Therefore, he encourages builders of the Future Generation to look to all available tools, which may include standardization, to achieve their goals.

Of course, we do not need to reinvent all of our approaches for the Future Generation. In the past, there were collaborative efforts that may be worth copying or customizing to our future needs. For examples, read the articles by Jerry Smith and Mark Cummings—two standards veterans who have used this tool to encourage cross-collaboration and build innovative technologies. Patrick Ryan, through his analysis of how a standards organization handled spectrum and satellite management, provides excellent insight into, and a few cautionary tales about, how technological advancement can occur. He provides recommendations for how this SSO can manage these technologies effectively for the Future Generation.

Coordination mechanisms can vary even within specific development and standards communities. To gain an understanding of the types of mechanisms that may come into play and their impact, read the article by Ruben van Wendel de Joode and Tineke Egyedi. By analyzing Java and Linux, these authors look at how to help solve the market fragmentation problem.

If you think standards setting organizations are unwilling to try new approaches, put those thoughts on hold and read John Ketchell's article to discover how a traditional SSO created a hybrid standardization mechanism to help better meet market needs. Of course, while new approaches are desired, there must also be a solid infrastructure to support them. The article by David White and John Keith provides solid advice for developing policies and procedures that support Future Generation standardization.

The last three articles in this section provide examples of how standardization is being employed to build solutions that meet user needs. Jon Bosak shows how existing technologies and standards were brought together to create a powerful and much needed solution: Unified Business Language (UBL). As discussed earlier, semantics will become a key part of the Future Generation. Dick

Raman discusses the need to define the meaning of pieces of information exchanged in a business environment at a global level. He describes how two organizations, UN/CEFACT and OASIS, collaborated to create ebXML, a global standard for eBusiness. Finally, Nick Mansfield looks at standardization and regulatory compliance. By linking good information management practices with legal requirements, he shows how to achieve acceptable and solid regulatory compliance.

Whether providing bridges between standards setting organizations, industries, cultures, or individuals, these authors show how to overcome differences to create powerful solutions. Standardization can serve not only as a mechanism for allowing different parties to col-

laborate, but as a catalyst for ensuring that this happens. By proactively bringing together the necessary entities to build Future Generation solutions, standards setting organizations can position themselves as the primary resource for creating tomorrow's technologies.

The Future Generation, in all its promise, may ultimately deliver that which technology has always tried to achieve. By requiring the involvement of all those it will impact, the Future Generation may bring more than phenomenal technology that allows us to communicate and share information easily. In the end, it may build a future generation of people who excel at communicating and collaborating across even traditionally