**BSA Statement on Interoperability:
Innovation, Choice, and the Role of Governments**

The Benefits of ICT

The integration of information and communications technologies (ICTs) into every aspect of modern life is generating huge gains for consumers and for the economy. Firms are using ICTs to become more competitive by using both their resources more efficiently and their employees more effectively. This drives productivity growth, resulting in real wage gains and prosperity for workers and lower prices and more choices for consumers.

ICTs are doing more than just helping firms increase output and lower costs. New software and hardware tools are fueling follow-on innovation both within and outside the ICT industry -- from transportation and manufacturing to agriculture, health care, education, and government. ICT innovations are helping companies transform business processes and are even creating whole new industries. Through improved ICT infrastructure and learning, governments are also giving their citizens the skills and tools to expand their opportunities, and even develop new commercial ventures.

ICT systems have become significantly more diverse in the last 10 years, and ICT customers, including government procurement officers, have taken advantage of this situation by pursuing the best technological solutions available to meet their needs, even if that means acquiring hardware and software products from multiple vendors. Fortunately, the ICT industry has risen to the challenge by improving interoperability in this increasingly heterogeneous environment.

Recently, some governments have taken an interest in promoting ICT interoperability. Governments have two distinct interests in this area:

- As <u>major customers</u> of ICT systems, governments will often wish to consider interoperability along with other key factors (*e.g.*, security, reliability, accessibility, overall value) when procuring products and services.

- As <u>policymakers</u>, governments will want to ensure that policies relating to interoperability promote innovation, consumer welfare, and competition.

This paper examines the many facets of interoperability in more detail in order to provide a foundation for principles to guide government action in this area.

Interoperability

The goal of interoperability is clear: to enable the products and services that are components of ICT systems to work together. This increases consumer choice, value, and competition by removing technical impediments to the use of products and services from different vendors. Although the term "interoperability" has somewhat different meanings in different contexts, in the ICT sector it generally is understood to mean the ability of products and services to exchange and use data. For example, the EU Software Directive defines interoperability as "the ability to exchange information and use the information which has been exchanged,"[1] while the U.S. E-Government Act of 2002 defines interoperability as "the ability of different operating and software systems, applications, and services to communicate and exchange data in an accurate, effective, and consistent manner."[2]

Critically, the goal of interoperability is *not* to achieve homogeneity of ICT products or services or to speed their commoditization—quite the contrary. A successful interoperability solution is one that promotes the exchange and use of data between products and services while allowing maximum room for vendors to innovate and differentiate their offerings from those of other vendors. The specifics of a particular interoperability solution will depend on the characteristics of that technological environment and may evolve and change over time as the technology evolves and changes. But a common touchstone for all interoperability solutions is whether they ultimately enable innovation and promote consumer value through competition, differentiation and choice.[3]

Interoperability is just one of many elements that users look for in an ICT product or service. Others include security, accessibility, reliability, privacy, overall value, and ease of use. Often, however, enhancing one of these elements may result in trade-offs with respect to others. For this reason, products vary in their level of interoperability, depending largely on customer needs and other factors. In some contexts, customers may place most importance on interoperability; in others, security or reliability may be paramount. In either case, it is important that customers have

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[1] *Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs*, recital 12. Similarly, the European Interoperability Framework, an initiative to facilitate ICT interoperability at a pan-European level, defines interoperability as "the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable sharing of information and knowledge." See IDABC, *European Interoperability Framework*, at 5 (Nov. 2004).

[2] *E-Government Act of 2002* § 3601 (1), 44 U.S.C. § 3601 (1) (2006).

[3] It is important to distinguish "interoperability" from "substitutability." Substitutability means the creation of a product that duplicates the functionality of another product. Interoperability, by contrast, preserves the ability of developers to differentiate their own products from others in the market – thereby fostering creativity, innovation, competition, and enhanced consumer choice – while ensuring that products and services can exchange data with one another.

the freedom to choose products that fit their needs, and that vendors have the ability to respond to those needs.

Paths to Interoperability

While there are various complementary paths to achieving ICT interoperability, four of the most common ways in which ICT companies do so are:

- *Designing products or services to promote interoperability.* In response to customer demand, software and hardware companies increasingly design their products to be interoperable with other products and service right "out of the box." Other firms specialize in offering solutions (such as translators, converters, and gateways) that facilitate interoperability between systems from multiple vendors.

- *IP licensing and technology sharing.* Many firms facilitate interoperability by licensing intellectual property (IP) rights needed to build particular interoperable solutions on either a royalty-free or fee-based basis. This makes it easier for other firms to develop interoperable products quickly and cost-effectively. Many firms go further and offer software development kits and other tools to facilitate the development of products that can seamlessly interoperate with their own.

- *Voluntary industry collaboration.* Two or more firms – sometimes partners, sometimes competitors – may also come together to collaborate and share technical information in order to develop interoperable products and solutions. Such efforts can be particularly effective where customers need a quick, flexible solution to the ways in which the products of particular vendors interoperate.

- *Technology standards.* Technology standards implemented in products and services likewise play a vital role in facilitating ICT interoperability. Although various types of standards are discussed in the next section, it is worth noting that voluntary industry led efforts have proven to be the most effective means of developing successful standards. Indeed, most of the widely adopted standards in existence today were developed through voluntary, supplier-led efforts -- FireWire, WiFi, PDF, QFX, Flash, and Java are just a few well-known examples.

Because it is often impossible to know in advance whether users will find a given interoperability solution attractive, such solutions should be voluntary and driven by industry responding to customer needs. In ICT markets characterized by rapid innovation and short product life-cycles, there is no single path to interoperability. One vendor may use a tool or set of tools that are different than the approach taken by another vendor. Just as ICT products and services rapidly evolve through

innovation, so must the approaches to interoperability between these products and services evolve through innovation.

These are complex, market-sensitive issues, and companies need freedom and flexibility to select the best solution for the specific purpose. This is particularly vital in the ICT arena since, as noted, interoperability is simply one of several factors that customers consider when selecting an ICT solution. Thus, as further discussed below, governments should promote competition between interoperability solutions by allowing the market to lead and refraining from seeking to direct this market development or picking technology winners and losers – both of which will deter innovation, competition, and consumer choice.

Standards

One way to achieve interoperability is through the development of standards, which are then implemented in relevant products and services. Standards are important because they can provide a stable technical solution to a common problem. That solution can be produced by a single vendor, a number of vendors through a collaborative effort, an industry consortium, or a formal international standards body, to name a few.

While there are different types of standards, many fall into one of two broad categories. "Proprietary" standards are generally developed and maintained by a single entity or a group of cooperating companies, rather than by a formal standards body. Proprietary standards are often published and the intellectual property needed to implement them is made available on reasonable and non-discriminatory terms, which may or may not include payment of a royalty.[4]

Another key type of standard is an "open" standard. Although views on what constitutes an open standard vary, there is fairly broad consensus that a standard which satisfies the following criteria qualifies as "open":

1. It is developed through an open, voluntary, consensus-based process.

2. The specification is publicly available without cost or for a reasonable fee to any interested party;

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4 Some examples of proprietary ITC standards that are broadly deployed and have had a significant positive impact on interoperability include Adobe's Portable Document Format (PDF), HP's Printer Command Language (PCL), IBM's Video Graphics Array (VGA), Sun's Java, Hayes' AT modem command set, IBM's Systems Network Architecture (SNA), Microsoft's Rich Text Format (RTF), Intel's x86 architecture, and the Universal Service Bus (USB), which was created by Intel, Compaq, DEC, IBM, Microsoft, NEC, and Northern Telecom.

3. Any patent rights necessary to implement the standard are available to all implementers on reasonable and non-discriminatory (RAND) terms, either with or without payment of a reasonable royalty or fee; and

4. The specification should be in sufficient detail to enable a complete understanding of its scope and purpose and to enable competing implementations by multiple vendors.

The form a standard takes may vary over the lifetime of the relevant technology. For instance, early in its lifecycle, a technology might appear as a proprietary standard offered by single vendor or a small group of vendors. Later, once the standard has achieved a measure of success and stability in the marketplace, it might be submitted to a standards body such as ITU, ISO, IEEE, Ecma, or ETSI, for formal adoption as an open standard.[5] Similarly, when technologies are relatively immature and experience periods of rapid innovation, with new solutions quickly supplanting older ones in the marketplace, formal standardization processes might simply be too slow to keep up with the pace of innovation.

Customers, of course, are focused primarily on whether any given interoperability solution works and is available to meet their needs. They are generally less concerned with the manner in which it was developed including how a standards component of that solution was developed. Under the market-led system in place today, consumers often have a choice of multiple standards solutions from multiple sources that have been developed using a variety of methods. This is innovation at work, and it is critically important that such innovation is allowed to proceed in order to promote interoperability.

Thus, care should be taken not to place too much emphasis on one form of standard over another as long as the ultimate level of desired interoperability is achieved. The test of *any* standard is whether it achieves the desired level of interoperability in a simple, efficient manner while leaving maximum opportunities for companies to expand and develop new technologies. Because it is impossible to predict how any specific solution will fare in the marketplace, policies should encourage competition between standards through voluntary, market-driven processes.

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[5] Three examples of this evolution are: (1) the Simple Mail Transfer Protocol, which evolved into a standard over time and is now available as an open standard; (2) the Open XML File Formats, which were developed by Microsoft, later adopted as an open standard by Ecma, and are currently under consideration for approval by ISO as an open standard; and (3) PDF, which was developed by Adobe, became a popular proprietary standard, and soon will be submitted to ISO for adoption as an open standard. Other widely used ICT open standards that began life as proprietary standards include TCP/IP, HTML, and LDAP.

The Role of Government

As already noted, governments have two distinct interests in interoperability: As customers of ICT systems and as policymakers.

As ICT customers, governments should define their desired level of interoperability and then allow government users to choose the solutions that best meet their specific needs. Governments should avoid one-size-fits-all approach to interoperability that could prevent procurement of the best product at the best price. The focus should be on interoperability results, not on preferences for specific standards, processes or technologies. Procurement rules should leave room for competing interoperability solutions to develop and for agencies to shift to new solutions as technologies advance and needs change.

As policymakers, governments should promote innovation in interoperability technologies and competing products, consumer choice, and competition. Governments should allow market forces to select the best interoperability solutions in individual cases and not mandate a specific approach (such as a standard), except when the industry as a whole has backed a single approach (*e.g.*, HTTP or TCP/IP) or in situations of substantial and specific public interest. Governments should also create incentives for innovation in interoperability technologies, including by ensuring respect for intellectual property rights in such technologies.

To guide government action in this area, BSA members respectfully urge governments to adhere to the following principles:

1. *Approaches to achieving interoperability should be driven by customer demand and market forces and take place through a range of methods.*

2. *Governments should not pick winners in the marketplace under the guise of promoting interoperability.*

3. *Governments should promote innovation in the area of interoperability.*

4. *Governments should refrain from legislating or regulating technology in the name of interoperability.*

More specifically:

5. *Governments should not legislate or regulate compulsory licenses on patents, copyrights, trade secrets and other forms of intellectual property to achieve interoperability.*

6. *Governments, in their role as ICT customers, have an interest in ensuring interoperability, but these objectives should be pursued*

within the context of specific procurements and the functional goals the government seeks to meet, not a as blanket policy, and should leave room for emerging solutions to develop.

7. *Governments should not establish preferences for standards based on whether the standard has been developed within or adopted by an established standards setting body.*