SCHOOLS INTEROPERABILITY FRAMEWORK

Schools Interoperability Framework
PESC Best Practice Submission

The School's Interoperability Framework's (SIF) vision is that schools will be enabled to better utilize data by implementing technology in a manner that leverages the promise and capabilities of interoperability between disparate applications.

I. Overview

Quality education relies, in large part, on professional educators and parents having access to information, resources, and tools to serve learners of all ages. Today, software applications available for pK-12 schools and their districts are either closed systems or systems that allow customer access only through proprietary interfaces and data formats. To a user, that lack of interoperability means applications and their data are isolated from one another, require redundant data entry, increase support costs and decrease efficiency with data that is inaccessible to decision makers.

The Schools Interoperability Framework Association (SIF) is a non-profit membership organization comprised of over 100 software vendors, school districts, various states, national departments of education and other organizations active in pK-12 education, who have come together to create a set of rules and definitions to enable software programs from different companies to share information. Since it's inception in 1999, the SIF membership has focused on the development of a set of platform independent, vendor neutral rules and definitions to enable schools to better utilize technology in a manner that leverages the promise and capabilities of interoperability between disparate applications.

II. WHY IS SIF NEEDED?

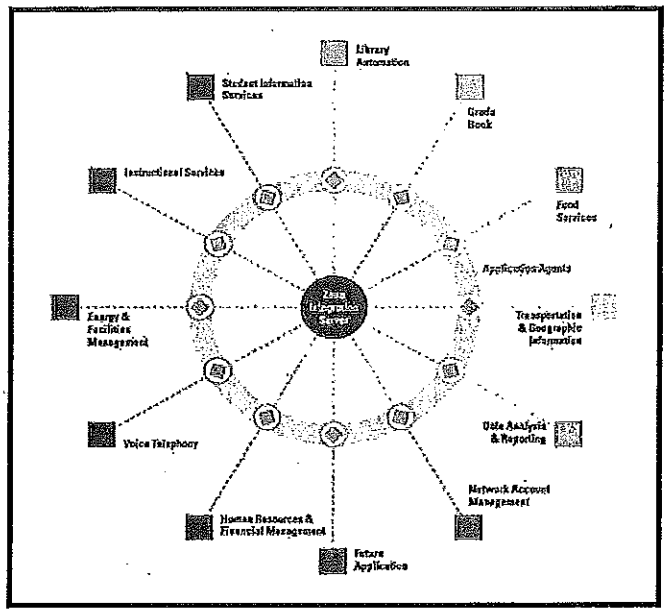
Education is facing a critical challenge in deploying technology due to the pressing problem of interoperability. Today, applications available for pK-12 schools and their districts are either closed systems or systems that allow customer access only through proprietary interfaces and data formats. To a user, that lack of interoperability means:

- Applications and their data are isolated from one another
- Redundant data entry is common
- Disconnected applications increase support costs
- Data reporting is costly and inefficient
- Data is inaccessible to decision makers

A. Horizontal Interoperability

Rather than have each application vendor try to create a separate connection to every other application, SIF has defined the set of rules and definitions to share data within a *SIF Zone*. A SIF Zone is a logical grouping of applications, in which software application agents communicate with each other through a central communication point – *the Zone Integration Server* (ZIS). Data is shared between applications through a series of standardized messages, queries and events written in XML and sent using Internet protocols. These events are defined by the SIF Specification.

SIF Agents are extensions of each application that serve as the intermediary between the software application and the SIF Zone. The ZIS keeps track of the Agents registered in the Zone and manages transactions between Agents, enabling them to provide data and respond to requests. The ZIS is responsible for all access control and routing and security within the system. Because the behavior of the Agents and ZIS are standard functionality can be added to a Zone over time by simply adding SIF-enabled applications.



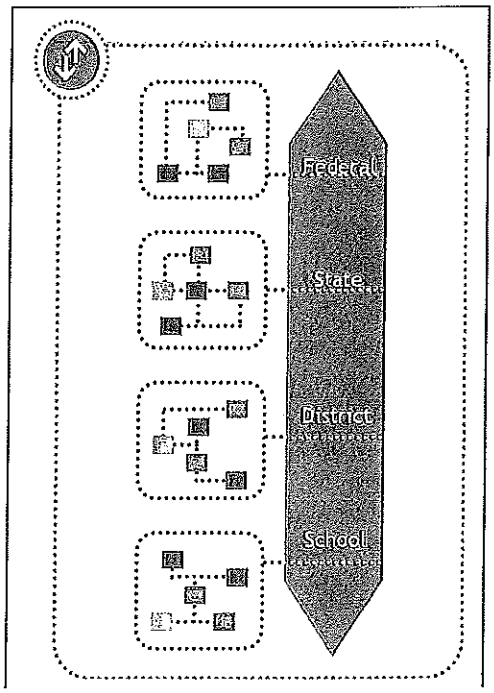
What are the Benefits to Schools & Districts Today?

- ✓ Streamlined data entry
- ✓ Increased data accuracy
- ✓ Refocus staff resources to service delivery rather than data input
- ✓ Increase instructional opportunities by reducing resource 'down time'
- ✓ Improved timeliness of service to students, families and staff
- ✓ Immediate flow of information to other agents
- ✓ Leverages existing Internet and LAN/WAN infrastructure and connectivity
- ✓ Allows choice of authentication methods and encryption strengths
- ✓ Enables "Best of Breed" approach to software acquisition
- ✓ Reduced maintenance

What are the Benefits to Schools & Districts Tomorrow?

SIF is working with representatives from states and the federal government to define the ways in which SIF can be expanded to support:

- ✓ Seamless reporting – ability to move data from school to district to state to federal levels
- ✓ Data driven decision making
- ✓ Collecting & analyzing information as it is developed
- ✓ Ability to populate data warehouses and utilize data mining
- ✓ Use business tools to analyze administrative functions
- ✓ Respond to changes as they occur rather than reacting to on an annual basis



B. Vertical Interoperability and Reporting

Vertical interoperability is a situation in which SIF agents at different levels of an organization communicate using a SIF Zone. Vertical interoperability involves data collection from multiple agents (upward) or publishing of information to multiple agents (downward). For example, a state

department data warehouse may listen for changes in district level data warehouses and update its database on a regular basis. Or, a state department may wish to publish teacher certification data to districts.

Vertical reporting using SIF is a special case of vertical interoperability. It is distinguished by the movement of pre-specified (and possibly large) packages of data at designated or predictable intervals. The SIF objects that are contained in the report may be any SIF data objects, representing either aggregate or granular information. The set of data objects help define the report. Other things that define the report are the date the report is to be submitted, the time period the report applies to, and the mandate that the report fulfills.

III. SIF History

In response to demand from educators, a series of meetings began in July 1998 between Microsoft Corporation in partnership with 18 other companies on the topic of interoperability between education applications. Their primary conclusion was that the best solution was for interested parties to collectively define standards that all software vendors could adopt. These standards would define common data formats, naming conventions, and rules of interaction between applications. These informal meetings became the Schools Interoperability Framework (SIF) which was officially launched in a speech by Bill Gates at the American Association of School Administrators on February 22nd 1999.

SIF was initiated with a set of data, infrastructure and support working groups which have evolved over time but which generally correspond to application verticals within pK12. Today 9 Work Groups are actively involved in specification development. In addition, SIF has a Technical Board, comprised of the co-chairs of the various Working Groups as well as a Board of Directors. Much of SIF's work is accomplished online and via monthly or bi-monthly conference calls, although quarterly face-to-face meetings are also scheduled with an Annual meeting and Board elections occurring each September.

On November 10, 1999 at the NSBA Technology + Learning Conference in Dallas, TX, SIIA and Microsoft announced the developers release of the first working SIF specification, In September 2001, version 1.0 revision 1 of the SIF Specification was approved by the membership. At the Florida Education Technology Conference (FETC) in February 2002, the first SIF-hosted live Zone Demonstration took place. For the first time more than 12 companies participated in multiple Zones all within the SIF booth. Response from both vendors and educators was overwhelmingly positive.

During this period, SIF also saw an increase in its international visibility with presentations in Australia, Europe, the UK and Canada. Much of this access was due in large part to SIF's developing relationship with the IMS Global Consortium. SIF's focus on pK12 administrative support data dovetailed nicely with IMS's focus on learning design and content portability for the higher education and corporate training markets. Joint efforts and ongoing collaboration have been successful in providing clarity for the marketplace as well as fostering future co-development.

In January 2003, version 1.1 of the SIF Specification was approved. This version is the release against which SIF Certification was judged. SIF contracted with The Open Group, an internationally recognized compliance organization, to help develop and manage the SIF Certification Program. The quality and workability of the SIF Specification is due solely to the time, efforts and talent of the hundreds of individual contributors to the Specification's

development. Without their personal dedication and their employers' significant corporate commitment, SIF would not have been possible.

In September of 2003 SIF was proud to welcome the United States Department of Education (USED) as its newest member. The USED will be active participants in the development and support of data models and technical specifications. Hugh Walkup, Director of Strategic Accountability Service for the USED states, "Through its membership in SIF the U.S. Department of Education intends to support common standards in educational data systems and to assure that Department data initiatives are aligned with and reflected in SIF standards."

SIF is excited to announce that the Specification Version 1.5 will be release at a joint SIF and National Center for Educational Statistics conference in Portsmouth Virginia Feb 23-25th, 2004. This landmark document will triple the amount of agreed upon data objects as well as allow for transport mechanisms to allow vertical reporting to take place for schools, states, and USED.

IV. Mission & Organizational Values

The Schools Interoperability Framework (SIF) Association advocates for and promotes the development and implementation of software that support the fluid movement of data between applications employed in pK-12 educational environments with the goal of improving the quality and efficiency of learning, teaching, and communication in education. Through the active participation of both public and private sector technology and educational communities, SIF provides an environment where our shared vision can be enacted. By being grounded in immediate implementations, the solutions developed through the collaboration of the members of these communities have an impact on how educational institutions plan and make purchase decisions today. SIF believes that educators, administrators, and parents own the educational vision, whereas, it is the obligation of those who serve education to develop environments in which that vision can be tested and evolve. Through the development and implementation of interoperability specifications, SIF supports the partnership between these communities to create sustainable capabilities to improve the quality of education for all learners.

The School Interoperability Framework Association is creating both "the" XML model of pK12 data and standards for a framework to make sharing of accurate information possible. Increasingly governments are seeking new ways to measure the effectiveness of their educational processes. With SIF, standard data can be gathered from the source in support of a "ground-up", vendor neutral approach. Just as no one teacher can be sure that no child falls behind, no one vendor can either. SIF is the industry's answer for gathering the data required for the complex reporting required in the US by the NCLB legislation. With SIF a school will be able to ensure that data showing which students are at risk of being left behind can move across vendors packages, across technology architectures, and across various layers of aggregated reporting to the person that can use that data to help those specific students.

The ultimate result of implementing SIF is increased student learning in the pK12 environment. By combining large and small software vendors with government entities at all levels, school leaders will finally be able to implement best of breed solutions with out manually moving data from one application to the other. Traditionally, this manual movement of data was only done on a limited basis between two applications. SIF allows all of the school applications to contain accurate data. This real time collaboration within the schools digital infrastructure not only allows new creativity among a schools vendors but also provides a vendor neutral method for pK12 entities to share data amongst themselves. Top level consumers of data such as the

federal governments will benefit greatly by having the ability to roll up data without the traditional "repurposing" that may invalidate the measurements that are trying to be made.

SIF works in real time allowing stakeholders involved in schools data to accomplish objectives that would be impossible without this cooperation. Quality management of schools and groups of schools will need to be increasingly driven by this data analysis and usage. *SIF is a key to the future of quality education.*

V. SIF Best Practice Components

A. Specification Development

SIF has improved the quality of education for over 1.5 million students and teachers across the US with numbers growing weekly. This improvement can be seen in the daily business management of schools, reduced technical support and infrastructure costs as well as a better usage of education data – a hallmark of the NCLB legislation.

1. **Open Specification**
   The SIF Specification is a freely accessible document off the SIF web site. Schools, states and even vendors who are not members can utilize the specification to develop interoperable applications. SIF wants a level playing field for all vendors by encouraging them to abandon proprietary technical interfaces that cost schools large dollars through being responsive to a specification originated from real-world school needs. Increasingly, schools are developed "home grown" solutions utilizing the specification that allows them to tailor data usage to their own needs. This can only be done via a vendor neutral and platform independent specification that only SIF has delivered on for US schools.

2. **Object Approval Process Model**
   The Education Advisory Panel (noted later) is the first sounding board to eventually developed technical specifications. According to the new SIF Object Approval Process voted on by the SIF membership, if a proposed data object does not make it through the school business use demanded by this panel, the object is never allowed in the developing versions of the specification. This is another way to ensure the outcomes developed by SIF are directed by school needs and the quality of the product is validated by real world needs from users.

B. Community Development

SIF has a unique membership blend of local schools, states, US Department of Education, educational associations and educational software vendors all focused on the same task: to empower schools to better utilize data. The most critical step in being successful at this task is providing a forum for educational agencies to identify their data needs and how vendors must be responsive to those needs no matter the technology platform or vendor. SIF has enacted numerous mechanisms on behalf of educators over the past six months for this to take place.

1. **Educational Advisory Panel (EAP)**
   This panel is made up of over 25 representatives from pK12 schools, state departments of education, US Department of Education as well as educational associations guiding the initiative to be supportive of their short term and long term data usage needs. This group focuses on policy and state/federal mandated activities to ensure alignment with developing SIF Specification being developed

according to their needs. Membership and representation on the EAP is not dependent on SIF membership.

2. **Educational Communities of Practice**
The SIF membership has developed online collaboration tools for educational stakeholders to share resources, best practices and general inquires between other educators interested in systemically changing how education is being done. One of these communities is focused on state level policies and mandated activities and practical solutions that SIF can provide. The other community is made up of schools supporting each other with interest that range from finding out more about SIF to implementing large interoperable systems at the local level. Both sites are accessible to members and non-members and are "owned" by the states and the schools – not SIF

3. **Implementation Task Force**
As the SIF initiative moves from an "awareness building" mode to a "school/state implementation support" mode, new mechanisms have been put in place to support members and non-members implementing SIF solutions. This task force provides ongoing support for these implementations through a Implementation Kit available for all on the SIF web site which walks through steps in implementing a SIF solution as well as providing support through the previously mentioned Communities of Practice communication tools. This "barrier breaker" activity has been one of the most supportive aspects of the SIF initiative.

4. **SIF Vendor Membership**
Since its inception, vendors have been pushing the development of the SIF Specification. Currently more and more vendors are joining SIF and forming their own communities to better respond to the more clearly articulated needs from educational entities. This awareness building is allowing for better designed products for schools and stakeholders. Vendors become members of SIF for the following reasons:

   - ✓ Sit at the table with pK12 entities in specification development to make sure their products are being receptive to school needs
   - ✓ Opportunities to tout products are SIF Certified (vendors need not be SIF members to be Certified)
   - ✓ Respond to the growing demands emerging from pK12 RFP's requiring SIF Certification
   - ✓ Additional lead time provided from pK12 RFP developers (if shared)
   - ✓ Opportunities to network with peers in the field for potential alliances and partnerships based on SIF

C. Certification

The *SIF Certification Program* is a formal program undertaken by SIF to confirm that software programs adhere to the rules and definitions of the SIF Implementation Specification. SIF has contracted with the Open Group a well respected international certification organization to serve as the SIF Certification Authority. The SIF Certification Program involves a series of formal tests which validate that software applications properly implement the SIF specification. A software program which successfully completes the program will be able to display the 'SIF Compliant' logo on its package, website and in promotional literature. The 'SIF Compliant' logo

is an indication that this particular version of the software program has been tested and certified to properly communicates and share information with other SIF Certified software programs.

Certification is important for both educators and software companies. For educators it gives them the confidence that the SIF Certified software applications they purchase can be integrated with other SIF Certified programs already deployed in their schools or districts with significantly less effort than was required to achieve similar integration success in the past. It also allows educators to choose 'best of breed' software applications that meet their computing needs, and it allows them to increase the number of programs sharing data with confidence. Currently 25 applications have achieved "Certification" status".

VI. Summary - Empowering Schools/States

For the first time since the emergence of administrative and educational technology in pK12 settings, schools are now the drivers of the solutions they want to implement. Previously, schools were dependent on the credibility and "good will" of the vendors chosen to implement solutions. SIF has allowed schools to utilized "best of breed" software applications of their choice while demanding SIF Certification by vendors to ensure interoperability. Vendors have been very active in responding to the demands currently being disseminated by the hundreds of Requests for Proposals (RFP) generated by schools each year. SIF even supplies RFP language on the SIF web site for schools to use as they place demands on vendor responses.

The basic tenet of effective teaching and learning is identifying a student entering the learning process, assess where that student is before instruction, allow for the learning events and then assess the impact of the learning that has taken place. SIF is beginning to allow this to occur in a more simple and automated fashion. SIF allows schools to focus less on the administration tasks of running a district and focus on their human and fiscal resources to their core business - teaching and learning.

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Schools Interoperability Member List

4GL School Solutions
Accu-Scan
ACE Software, LLC
Achieve, Inc.
Administrative Assistants Ltd.
Anoka-Hennepin School District
Apple Computer, Inc..
Aspire Learning
Blackboard, Inc.
Cal Data Systems, Inc
CELT Corporation
Central Minnesota Research & Development Council)
Central Susquehanna Intermediate Unit
Century Consultants
Chancery Software Ltd
Classwell Learning Group
Cncl of Chief State School Officers
Comalex, Inc.
COMPanion Corporation
Compass Learning Corporation
Computer Power Solutions of Illinois
Computer Resources, LLC
Consortium for School Networking
ConVal School District - SAU 1
CrossPointe, Inc.
CSSG, Inc. - SOLAR
Curriculum Associates, Inc.
Cybersoft Technologies
Data Futures, Inc.
Delaware Department of Education
Dynix Corporation
Edline, LLC
EDP Incorporated
Educational Systemics, Inc.
Educational Testing Service
Edustructures
Enterprises Computing Services, Inc.
Erie 1 BOCES
eScholar, LLC.
Follett Software Company
Food Service Solutions
Gateway to Educational Materials
Harcourt Education
Horizon Software International, Inc.
Horizon Software Systems, Inc.
IBM Corporation
Idaho Dept of Education/Rich Mincer
Infinite Campus
InfoHandler.com
JES & Company
Kaplan K12 Learning Services
Kyrus
Laidlaw Education Services
Learning Technology Systems, Inc.
Lightspan, Inc.
LunchByte Systems, Inc.
Mandarin Library Automation, Inc.
Maryland State Dept of Education
McGraw-Hill Learning Network
Microsoft Corporation
MUNIS
NCES
New York City Dept of Education
Northwest Evaluation Association
Novell, Inc.
Ohio Department of Education
Ohio SchoolNet Commission
Olympia Computing Company, Inc
OneVision Enterprises, LLC
Orbit Software, Inc.
Otis Educational Systems, Inc.
Park County School District 1
Parlant Technology, Inc.
PCS Revenue Control Systems, Inc.
Pearson Digital Learning
PESC
PhoneMaster/US Netcom Corp.
Pittsburgh School District
Plano Independent School District
PLATO Learning, Inc.
Prince William County Schools
Reba Software & Services, Inc.
Renaissance Learning, Inc.
Rockwood School District
Sagebrush Corporation

San Diego County Office of Educ.
Sartox, LLC
Scholastic.com
School Center
Schoolhouse Software
School-Link Technologies
SchoolMAX
SchoolMessenger
SchoolNet
SchoolOne
Scientific Learning Corporation
Skyward, Inc.
Smartweb Technology, Inc
Softlink America, Inc.
Software & Information Industry Association (SIIA)
Software Technology, Inc.
Sun Microsystems, Inc.
SunGard Pentamation
Sweetwater School District 2
Teaching and Learning Network
TechERA
TENEX Systems, Inc.
TetraData Corporation
Texas Instruments
The CLM Group, Inc.
The Grow Network
Third Day Solutions, LLC
TIES
Union Public Schools
US Department of Education
US Open e-Learning Consortium
VersaTrans Solutions, Inc.
Virginia Department of Education
Visual Software, Inc.
Washington School Information Processing Cooperative
Wyoming Department of Education