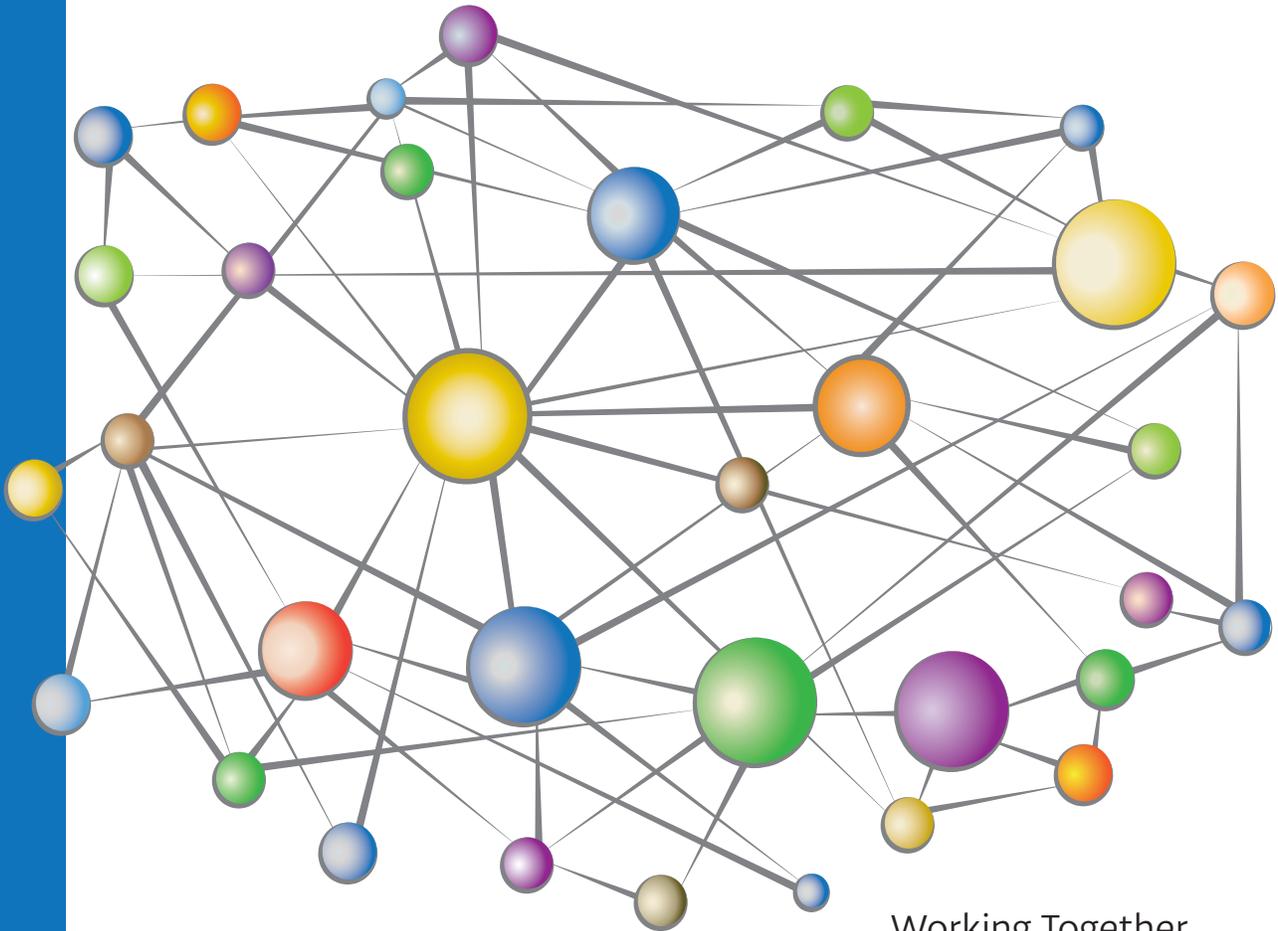


# INTEROPERABILITY

## Standards for Education



Working Together  
to Strategically Connect  
the K-12 Enterprise

# **WHY INTEROPERABILITY STANDARDS MATTER IN K–12 EDUCATION**

**K–12 education  
institutions  
increasingly**

**are looking to digital content and related e-learning technologies to meet evolving education needs and goals. Technology-based products, services and resources are making positive impacts on education and are improving efficiency and outcomes in teaching, learning, and classroom and school management. And yet, as educators grow more sophisticated in their use of technology, there are gaps in the integration and interfaces among disparate applications.**

Historically, the case for interoperability—the seamless sharing of data, content and services among systems or applications—has not been compelling in the K–12 education market. As long as programs were restricted to individual computers or small local area networks, the costs to developers of agreeing on and implementing comprehensive, industry-wide standards were rarely justified by the benefits. Many vendors chose, instead, to focus on proprietary designs that, while solving the needs of their customers, did not allow for easy integration with systems from other vendors. Likewise, education decision makers traditionally have been more concerned with locating products that meet their immediate teaching and administrative needs than worrying about data integration as a technical requirement.

Today, however, with the advancement of the Internet and increasing reliance on digital delivery, the usability of isolated K–12 data, content and learning applications is rapidly diminishing. The growing popularity of cloud computing is amplifying the need for interoperability standards that empower school districts to combine multiple services into their IT managed portfolios, which is increasingly a combination of cloud and on-premise solutions.

Interoperability also is a logical response

to the growing demand for data warehousing, sophisticated analytics, accountability reporting and performance management tools. Districts are seeking to leverage their content and data assets strategically across a number of systems and assemble best-of-breed solutions that integrate content and applications

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from a variety of sources and vendors. For cost efficiencies, as well as teaching and learning effectiveness, interoperability standards are a necessary component of these emerging systems.

It is clear that vendor-customized solutions for integration are not a good solution for K–12. A more comprehensive set of industry interoperability standards is needed. The ultimate goal is to create a “plug-and-play” interoperability environment in which applications from multiple vendors can exchange information automatically and without

customization. Notably, although they simplify integration, application programming interfaces (APIs)—a set of tools, programs, routines and protocols for integrating applications—usually are not plug-and-play. Instead, APIs often are specific to their application, making it harder for other vendors to adapt their products without writing a customized interface.

Over the past decade, K-12 stakeholders have been collaborating to define the underlying and architectural standards necessary for plug-and-play interoperability. These initiatives are producing useful and promising results. Although the process is far from complete, the foundation for interoperability exists today.

There are many different, overlapping categories of interoperability, each with its own challenges and evolving standards. File sharing, for example—involving common file formats such as CSV, HTML, XML, PDF and Open Document Format—is a simple form of interoperability that has matured to such a degree that many of us take for granted the ability to use our choice of tools to read, and even edit, files created in a totally separate application. Digital accessibility, on the other hand, is more complex, with laws, guidelines and standards that could be the topic of an entirely separate publication.

## **Eight Key Areas of Interoperability Standards**

This primer focuses on eight key areas of interoperability standards:

- 1.** Digital content
- 2.** Data connectivity
- 3.** Data integration
- 4.** Authentication, authorization and identity management
- 5.** Portals and portlets
- 6.** File sharing
- 7.** Network infrastructure
- 8.** Digital accessibility

This primer also covers interoperability governance at the district level, and looks ahead with salient questions about using interoperability standards.