inBloom Products & Services

Scope & Technology Overview

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1. inBloom & Document Overview

inBloom is working to deploy a set of technology products and services that work together with existing standards to enable data and content interoperability in K-12 education.

1.1.   Data Interoperability

Data-driven instructional strategies and technology tools have the ability to assist educators in improving and accelerating student mastery through the Common Core State Standards and other untested subjects. Individual tools and strategies exist today, but sharing data across different tools remains very difficult for educators and IT leaders. Overcoming these data interoperability barriers are core to enabling the products and strategies that drive personalized learning in the classroom.

inBloom provides a secure, multi-tenant, cloud-hosted data store designed to help states and districts manage their student enrollment and achievement information currently housed in multiple source systems. Innovative classroom applications will be able to access that enrollment and past achievement data with a single integration pattern.

1.2.   Content Interoperability

Search engines and content recommendation engines need to be able to return highly relevant instructional content that addresses student need based on actual achievement data. The Common Core State Standards require a shared approach to metadata and indexing to enable more efficient content discovery and more impactful recommendations.

inBloom is also building a technology service called the inBloom Index. The inBloom Index stores information on learning objectives and learning resources called metadata. This service leverages the Learning Resource Metadata Initiative (LRMI) which is led by the Association of Educational Publishers (AEP) and Creative Commons.

*This document provides an introductory overview of the scope, capabilities and technology standards associated with inBloom's products and services. For detailed specifications on any technology component, please visit: **http://www.inbloom.org/resources***

2. The inBloom Data Store

The inBloom Data Store is a secure, cloud-hosted data store designed for states and districts. The data store is capable of maintaining data about organizational structures, schools, and employees, as well as information on student enrollment, biographical and achievement data. States and districts will be able to load data from an array of local or vendor-held systems through high-volume data interfaces. Once data load processes are established, states, districts, and locally-authorized vendors will have access to the assembled data to power their products and solutions with a single interface.

The data store's logical data model, which describes the data that may be housed in the inBloom Data Store by SEAs and LEAs, is highly aligned to the Common Education Data Standards (CEDS). The data store also includes an expanded data dictionary as well as the ability to store custom data that may be unique to a particular SEA/LEA need or application. Supported data entities can be generalized by the following families:

- Education Organization Structure
- Master Schedule
- Academic Record
- Assessment
- Program & Cohort
- Discipline

The inBloom Data Store is currently scoped to hold up to 16 years of historical student achievement data. Data access can be restricted by user role and organization as well other local business rules.

2.1. Loading Data

In order to offer consuming applications a single location for all relevant information, inBloom offers multiple methods for SEAs, LEAs, and vendors to integrate their data sources with the inBloom Data Store:

- **Bulk Data Load - XML Format**
  Facilitates exchange of XML-formatted batch files via an SFTP ingestion process

- **SIF Agent**
  A SIF 2.0 adapter that may interface with existing SIF Zone Integration Servers

- **CSV Converter**
  Exemplar sample code for tools that will convert local CSV files into XML files

- **Record Level API**
  Event-driven, RESTful data loading utilizing a modern web services architecture. API includes basic "CRUD" functions (create, read, update, delete)

- **Built-in adapters for select SIS/Assessment vendors**
  A growing number of SIS and Assessment vendors will voluntarily enable native integration of their platforms and products with the inBloom Data Store.

LEAs and SEAs will be responsible for sourcing, governing, loading and validating their data, but inBloom will offer basic validation tools for integration testing.

2.2. Consuming Data

inBloom also offers multiple methods for SEAs, LEAs, and vendors to pull data from the inBloom Data Store for their applications or other needs as authorized:

- **Record-Level API**
  The preferred method for data access utilizing a modern web services architecture. API includes basic "CRUD" functions (create, read, update, delete)

- **Bulk Data Extraction - XML Format**
  XML-formatted batch files for bulk downloading of available data.
  (Available late Q1, 2013)

2.3. Identity Management

Identity management is a set of services that enable an inBloom application to reliably identify a user (authentication), and to establish what actions that user is permitted to take with data in the data store (authorization). It also facilitates Single Sign-On (SSO) – facilitating secure exchange of identity information among applications so that it is not necessary for the user to enter credentials for each application separately.

In order to achieve authentication integration and SSO with the inBloom Data Store, an SEA or LEA must have a Directory that stores all of the user identities that will access inBloom, and that is able to associate each identity with the roles that will govern the user's permissions within the inBloom environment and enable FERPA-compliant access to PII.

Federated Authentication Model – When logging into an inBloom app, a user is prompted to provide the user name and password directly to the SEA/LEA identity provider using the SAML 2.0 protocol. The identity provider authenticates that the information is correct, and returns a SAML 2.0 assertion to inBloom indicating that the user supplied the correct credentials as well as role information for that user.

2.4. Role Management

inBloom will provide a number of default roles with associated data access permissions as templates. SEA and LEA administrators may create custom roles based on derivatives of these archetypes.

- **Aggregate Viewer**: Individuals interested in aggregate/summary data as well as trends, but not able to see individual-level record information.

- **Educator**: A person who works for education organizations and is interested in student outcomes. Generally, educators are the people who interact directly with students on a daily basis.

- **Example roles**: Teacher, Classroom Assistant, Athletic Coach.

- **Leader**: Interested in students in one or multiple schools. In addition to individuals, they may be interested in summary information.
  Example roles: School Principal, Dean, Department Head, Special Ed Expert, School Psychologist, Guidance Counselor.

- **IT Administrator**: May not have a direct educational interest in particular students, but administers systems that help educators and leaders by making data available to them.

- **Student**: A default template for this role will be implemented in 2013

- **Parent**: A default template for this role will be implemented in 2013

2.5. Administrative Tools

The inBloom data store includes access to system configuration tools and general administrative abilities to SEA and LEA system administrators.

- Approve and revoke vendor or other application access to the data store
- Data validation tools allow admins to view available data
- Create an organizational realm and map SEA or LEA system access roles
- LEAs may delegate certain district privileges to the state
- Access application-specific settings as made available by 3rd party vendors

2.6. Sandbox Environment

The sandbox environment is a full replica of the production environment with fixture data, designed for developing and testing application prototypes. Each sandbox account is a logically distinct tenancy that mimics the production data store while being completely isolated from any live data. Sandbox users are typically vendors and individual developers wishing to try new ideas or develop systems without impacting existing services.

Sandbox environments are not for use with real data containing Personally Identifiable Information (PII) and user may experience different performance levels than official production instances.

3. Content & Learning Resource Solutions

Learning resources are available from a large number of sources today, but when these resources are aligned with standards, teachers can more easily solve the problem of finding appropriate resources in ways that reduce administrative burden, while increasing the quality and result-oriented impact of materials provided to individual students.

The Learning Resources Metadata Initiative (LRMI) is an organization chartered with defining a vocabulary used to describe the specific properties of educational resources that make them unique from other types of content. These so-called metadata terms are extensions to the Schema.org namespace, meaning that they are compatible with the web page markup syntax understood by search engines, but they can also be used in resource descriptions distributed through the Learning Registry. LRMI-defined metadata includes items such as:

- Appropriate users and demographics
- Learning objectives or learning standards
- Time typically required to use the resource
- Type of learning resource (e.g. presentation, video, hand out, assessment)

When pairing the LRMI with the advent of the Common Core State Standards, inBloom saw an opportunity to provide a framework and core infrastructure that supports alignment of learning resources, assessments and student achievement data with the Common Core or other state standards.

2.7. inBloom Index

The inBloom Index establishes a link between applications and learning resources by storing and cataloging resource descriptions and allowing the described resources to be located quickly by the users who seek them. This capability is based in large part due to resources alignment with the common core and state-specific learning standards.

Information about learning resources is obtained from the Learning Registry network, a joint technology effort of the U.S. Departments of Education and Defense. The Learning Registry network project is supported by public, private and nonprofit members who participate in various roles as educational content publishers, indexing and search providers, and content consumers. Based on an open framework, the network allows anyone to subscribe to, and make use of, the information flowing through it.

The inBloom Index service catalogs and receives updates from all the publishing nodes and filters out announcements received from the network that are not relevant to educational resources or other educational objects. Content providers and local agencies with their own repositories will be able to announce the location of their learning objects either by establishing their own Learning Registry network node, or just by utilizing the inBloom. As nodes are established, inBloom users or applications will then be able to search a wider catalog of accessible material that is more targeted and therefore more relevant to their personalized learning needs.

The inBloom Index is still in development, but is on track to be complete in early 2013. The following are example functions that inBloom Index-integrated applications may be able to make using the open APIs. The usage of these capabilities will be based on local priorities and policies.

- Announce usage of resources by an inBloom education organization
- Announce applicability of resources for an inBloom education organization
- Announce the effectiveness of resources
- Announce relationships between state standards and the common core
- Announce teacher ratings for content from an inBloom education organization
- Announce updates to content
- Announce LRMI-based tagging of content
- Announce changes to the Common Core

2.8.   inBloom Tagger

inBloom has developed an open source content tagging tool based on ongoing feedback from participating districts and states. The inBloom Tagger allows publishers and local maintainers of teaching and learning materials, assessments, and other types of resources to label each item as to its intended audience, applicability and alignment to learning standards. The generated resource descriptions are then published to the inBloom learning registry node for inclusion in the inBloom Index.

Users can create resource descriptions for large quantities of content, aligning items with the Common Core, state standards, or locally defined standards for untested subjects, according to the LRMI and inBloom-defined vocabularies.

The utility will be made available as a web app with the ability to tag single resources or batch-tagging of multiple resources. The inBloom Tagger is currently live, but additional development continues with plans for a new release in Early 2013.

2.9.   inBloom Search App

This application provides for discovery of learning resources via the inBloom Index based on user search terms. Similar to Tagger, the utility will be made available as a web app.

The search app is currently live, but additional development continues with plans for a new release in early 2013. Advanced search capabilities based on user role, content filters, and other contextual information are planned for later in 2013.

2.10.   inBloom Data Browser

This application provides for discovery of learning resources through general browsing of content available to the particular user based on organization and user role.

The inBloom Browser is scheduled to be released in the first half of 2013.

4. inBloom Exemplar Applications

inBloom has invested in a number of exemplar applications that demonstrate the advantages of using inBloom products and services. The applications selected are based on the highest needs expressed by the education community. These exemplar applications provide inBloom aligned organizations with a jump start in their local development efforts and may require local customization efforts. The open source code can also be used as reference, as all of the inBloom exemplar applications utilize the same APIs that are available to all 3rd parties.

Use of inBloom exemplar applications is completely voluntary for states and districts.

2.11. inBloom Dashboards

inBloom Dashboards allow educators to see information about their students individually or by class, school, and other groupings. inBloom-provided dashboards are designed to be modified and customized.

Basic capabilities and features include:

- **Student Lists**: Grade book-like interface to view classes/sections of students that an educator has access to
- **Student Profiles**: Provides detailed information for individual students
- **Search**: Allows users to search by student name and view results of only those students the user has access to
- **Sorting and Filtering**: Sorting of fields on student lists and the ability to filter based on common attributes

Dashboards are customizable in a number of ways. Administrators will be able to specify default selections of fields and their order of appearance, select various data visualization options, and configure colors or other similar look and feel aspects.

As with all inBloom-enabled applications, access to student data is based on the user's role and association with individual students, sections or organizational hierarchy.

2.12. inBloom Manager

The inBloom Manager is a single destination to access applications approved for that user in one location. The inBloom Manager is only intended to be a reference implementation and provides a bare-bones access point for testing. The portal includes standard headers and footers that may be utilized by the organization across application

to make their site look and feel more uniform. In the future, administrative tools will be accessible through the inBloomadministrator login website.

2.13.   inBloom Map Maker

inBloom Map Maker is intended to be used by curriculum teams or solution providers to select a set of learning objectives and to create arrangements, or pathways, through the objectives.

inBloom Map Maker is currently in proof of concept status and will be available at the end of Q1, 2013.

2.14.   Learning Maps Visualization Tool

The Learning Maps Visualization Tool provides a graphical representation and rendering of pathways authored by SEA or LEA teams utilizing Map Maker . The inBloom visualization tool will include the ability to link learning objectives with appropriate learning resources through an inBloom Index search.

Learning maps may be extended with custom development by sites to integrate the inBloom Data Store to calculate individual student mastery based on local definitions, and/or make personalized recommendations.

The Learning Maps Visualization Tool is currently in proof of concept status and will be available at the end of Q1, 2013.

2.15.   inBloom Bounty Applications

inBloom committed to deliver a number of additional applications by leveraging the open source community in an inBloom-funded bounty process. inBloom identified a list of potential application types leveraging live field research with over 800 educators.

inBloom selected two bounty recipients based on a proposal process that included feedback from inBloom pilot states and districts.

2.16.   Bounty App – Student Data Aggregation Calculator

The first inBloom bounty recipient, Start-up organization "Upeo," is developing a flexible and intuitive app that allows teachers and other roles to create flags with specific

conditions, and run those conditions across the student database to identify subsets of students who meet the criteria. The flags can be saved for future use, creating an easy-to-use tool that can quickly identify students who, for example, have brought in permission slips for field trips, qualified for the honor roll or turned in specific homework assignments.

The Student Data Aggregation Calculator will be available at the end of Q1, 2013.

2.17.   Bounty App – Student Groups Tool

A second inBloom bounty recipient, "Team MnM," is developing an app that allows districts, schools or teachers to pre-construct grouping options and lessons within a unit-based learning map. It will also allow teachers to guide groups of students towards similar tasks, activities or resources based on classroom assessments, enabling them to structure more personalized learning opportunities within a collaborative setting.

The Student Groups Tool will be available at the end of Q1, 2013.