SAN FRANCISCO USD
RFP NO. ED-FI 2018 IMPLEMENT AND SUPPORT AN ED-FI UNIFIED DATA SYSTEM INFRASTRUCTURE IN AWS
DUE: MAY 23, 2018 2:00 PM
[FOLLOW-UP CLARIFICATIONS—DUE JUNE 8, 2018]

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June 8, 2018

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The following information is in response to SFUSD’s email requesting further responses to questions about RFP ED-FI 2018 Implement and Support an Ed-Fi Unified Data System Infrastructure in AWS. Because our responses in this document reference the three options in our original proposal, that section of our proposal has been included at the end of this document. Please see our full proposal, though, for all the related details.

Please feel free to contact us if you have further questions or would like to have a demonstration of our proposed solution:

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Based on the information provided in the RFP and the SFUSD-MSDF grant proposal shared in the RFP Q&A document, please provide details and your best estimate for the costs related to extending the Ed-Fi data model for year 1. If these costs were already budgeted for in your response, please clarify the resources (people, number of hours, cost) devoted to that work.

- For proposed option 1 (as described in our original response), these costs are already budgeted and included. Hoonuit’s proposed solution is built on the premise of data interoperability and the fact that each customer will have certain requirements unique to them. Hence, Hoonuit’s solution inherently provides support to extend our data model with backwards compatibility and on-going support and maintenance in an elegant and cost-effective manner that takes into account your future needs and scale.

- For proposed option 2 (as described in our original response), extending the data model will also warrant corresponding changes to the underlying APIs, documentation of these changes as new Ed-fi versions are released, stringent QA processes for each API, as well as integration testing of all the overall changes and deployments to various environments. Finally, training will also be needed to allow teams to be well-versed with these changes to become self-sufficient with the platform. For each of the 17 entities listed in the project plan – Students, Schools, Staff, Staff Assignments, School Dates, Facilities, Courses, Course Offerings, Scales, Enrollments, Attendance, Discipline / Behavior, Program and Program Memberships, Marks-final; Period, Marks-Curriculum and Student Schedules, we anticipate 960 hours to extend the data model. In case some of these entities are not required, the required hours will be fewer. The resources devoted to this work will include a Project Manager, several development resources, QA, documentation, and training.
  
  o **Please consider:** Even though Hoonuit has comprehensive experience and technical ability to extend the Ed-fi data model as required to meet SFUSD’s requirements, Ed-fi strongly recommends against extending the Ed-fi data model. This is because extending the model defeats the purpose and benefits of all customers and source applications conforming to a “standard.” Extending the model will cause breaking changes and re-work resulting in time, effort, and cost. Hence, we are proposing option 1 that seamlessly and elegantly meets SFUSD requirements with proven expertise in California.

It is critically important to SFUSD that we are active members in the Ed-Fi Alliance and share our solutions with the broader Ed-Fi community. For proposers who provided proprietary solutions, please provide specific details on what SFUSD would be able to share back to the Ed-Fi Alliance and its partner members, versus what you consider to be proprietary.

- Hoonuit has been a committed and active member, participant, and contributor of Ed-fi since the beginning. Hoonuit’s Intervention Management module, as well as School Improvement Planning module, are considered “host applications” (or transactional applications) to the Ed-fi model. We will contribute the results of these transactional systems and respective measures to Ed-fi.

- Hoonuit’s data integration, management, and data model aligns with Ed-fi and CEDS data standards and is a consumer of the Ed-fi model versus a host. That said, Hoonuit’s data model is far more comprehensive, including several data domains such as health, immunizations, surveys, social emotional non-academic constructs, FAFSA, predictive statistical modeling and machine learning measures, student growth percentiles, and more, as well as hundreds of additional attributes even for standard entities such as attendance, enrollment, academics, assessments, etc. Hoonuit considers our data model, pre-built connectors to SIS, assessments,
food management, transportation, HR, finance, program services, early childhood etc., ETLs and universal data loaders to be proprietary.

*Please provide specific insights as to where you feel you lacked sufficient information to accurately bid/respond to the SFUSD project RFP and where you feel the project is most vulnerable to budget or costs overruns.*

- Our primary concern is the RFP’s focus on requiring a specific technology infrastructure versus allowing for the best technology—with a proven ability to meet the districts’ vision, goal, and initiatives—to be implemented at SFUSD. Specific concerns include:
  - Only one application—Synergy—out of the 15 applications that SFUSD requires data to be integrated from is Ed-fi compliant. Additionally, only seven student information systems—and no other source systems to-date—have certified on Ed-fi. Hoonuit is able to seamlessly integrate with ALL systems listed in the 3-year plan of the RFP using our pre-built connectors and universal data loaders. However, we are concerned about the viability of these applications conforming to Ed-fi in the timeframe that SFUSD has laid out.
  - Ed-fi strongly recommends against extending the Ed-fi data model as it defeats the purpose of having a “standardized” data model. Extending the model will cause breaking changes and cost-prohibitive re-work. In order to meet SFUSD’s priority of equity to enable new and improved processes enabled by data that is timely, unified, and of high quality, the current Ed-fi data model is limited and hence, will need to be extended. We are concerned that this will eventually result in a more expensive implementation over time for SFUSD. Hoonuit’s “option 1” is least vulnerable to this concern as we have developed the most comprehensive PK-12 data model. Any extensions to our data model are fully maintained by Hoonuit with backwards compatibility and very deliberate consideration for breaking changes, if any.
  - Since backwards compatibility is NOT maintained between major version releases of Ed-Fi, there will be time, effort, and cost required to redo breaking changes and cost-prohibitive to maintain overtime. Hoonuit’s “option 1” is least vulnerable to this concern as we have developed the most comprehensive PK-12 data model. Any extensions to our data model are fully maintained by Hoonuit with backwards compatibility and very deliberate consideration for breaking changes, if any.
  - As Ed-fi is a “community based” standard, we are concerned of ability to address needs specific to SFUSD’s implementation that do not align with Ed-fi data model and / or source systems that don’t conform to Ed-fi. Will SFUSD’s reporting needs of your educators, administration and leadership be left unaddressed until Ed-fi adds those attributes and vendors certify their solution or will SFUSD incur unnecessary expense maintaining and then re-working these extensions year-after-year.

- Based on our extensive experience of implementing data integration, management, and analytics solutions in California, we have proposed 3 options (see at the end of this document) to highlight the flexibility, extensibility, and interoperability of our solution to help SFUSD realize their mission, vision, goals, and objectives. Hoonuit’s “option 1” is least vulnerable to concerns listed above as those assumptions are based on all of our proven experience in California (and nationally).
Please provide additional details on the roles each of your project team members will play on the project, the number of hours they will be devoted to the project, and the extent to which you will be on-site over the course of our implementation timeline versus remote.

- Note that Hoonuit team member hours on the project are dynamic and will change as we progress through your implementation and ongoing projects. While we have provided an estimate for each role/task below, note that hour allocations will adjust as the project progresses.
  - **Project Manager—10%**
    - Acts as your main point of contact to coordinate communications between Hoonuit and SFUSD; solicits and organizes your requirements and expectations for the project; applies extensive implementation and California data domain experiences to streamline the implementation process; participates in training sessions with district developers and administrators
  - **Solution Developers—45%**
    - Applies extensive knowledge in designing and developing ETL procedures and assessment loaders for your solution; contributes to analyzing, mapping, validating, and documenting SFUSD data; participates in training sessions with district developers and administrators; relies on expertise to quickly resolve any functional or technical issues
  - **Dashboard Developers—20%**
    - Creates, configures, and customizes data visualizations for the needs of SFUSD users (including teachers, administrators, staff, and community stakeholders); verifies the dashboards support your unique workflows
  - **Business/Data Analyst—25%**
    - Relies on state-level and district-level knowledge of data sources to support implementation of a longitudinal data system and advanced analytical application; coordinates the analysis, mapping, validation, and documentation of California specific K-12 data (including assessments, special education, advanced financial solutions, and more); monitors and addresses SFUSD questions concerning your source data integrity or quality issues

Please provide updated financial statements for the following calendar years: 2016 and 2017. If these financial statements are not available, please provide a letter of justification from your CFO or accountant explaining why they are unavailable and attesting to the financial health of your company.

- Included in our original response are our available financial statements; 2017’s statement is not yet available from the auditor.
- Per Hoonuit’s CFO, Clay Anderson:
  - As evidenced by the Independent Auditor’s Report, Hoonuit has started routine full financial statement audits since fiscal year 2015 (beginning with the purchase of Versifit Technologies). This company acquisition brought with it many new accounting considerations, including the expensing of various elements of the original purchase that are non-cash in nature but nonetheless are recorded in the net losses displayed for the years shown. Further, Hoonuit is majority-owned by two different private equity entities, and the capital structure they’ve employed also contributes to the presentation of the operating results.
Please indicate what experience your company has working with California districts, California Charter Management Organizations, of the California Department of Education as it relates to standing up an Ed-Fi data infrastructure. If you do not have experience with any of the above, please affirmatively state that you do not.

- Hoonuit is the leading provider of data management and analytics for schools, districts, and regional service centers in California, including Silicon Valley.
- Hoonuit’s experience in California includes providing a fully integrated, flexible, and extensible, fully managed platform in the cloud for schools and districts to help close the achievement gap for ALL students, including several out-of-the-box dashboards built to meet California’s requirements.

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- Hoonuit’s solution helps meet LCAP and LCFF reporting mandates, such as Identifying High Needs Students, Smarter Balanced Assessment, CELDT and ELPAC Assessment Performance over Time, CELDT Student Progress, College Readiness Advanced Placement, College Readiness Credits, English Language Learners, Social-Emotional and Culture/Climate indicators, CTE Courses, Attendance Monitoring, Monitoring Students at Risk, and more to ensure every student who enrolls will graduate prepared to succeed in college, career, and life.
Listed below are the California districts that we provide data management and analytics to through our partnership with **Santa Clara County Office of Education**—serving over 250,000 students, and growing. The project started in 2012, and we continue to add districts to the ongoing solution. Some of the districts include:

- Alum Rock Union Elementary School District
- Campbell Union School District (Elem)
- Fremont Union HS District
- Luther Burbank School District
- Mountain View Whisman School District
- Santa Clara Unified School District
- Jefferson Elementary School District
- Pacifica Elementary School District
- Cambrian School District
- Evergreen Elementary School District
- Milpitas Unified School District
- Campbell Union High School
- Franklin-McKinley Elem
- Los Altos School District
- Mountain View Los Altos High School District
- Palo Alto Unified
- Hillsborough City School District
- Jefferson Union High School District
- Berryessa Union Elem
- East Side Union High School
- Los Gatos-Saratoga Joint Union High
- San Jose Unified School District

**Long Beach Unified School District**—serving more than 75,000 students—is a Hoonuit customer for data management and reporting. As of May 2018, Hoonuit has been selected to provide comprehensive data management, reporting, and analytics to **San Diego Unified School District**, serving more than 105,000 students, as well as **Santa Ana Unified School District**, serving more than 50,000 students.
• Hoonuit has been providing the platform, solution, and services for these schools, districts, and regional service centers using “Option 1” of our proposed solution. The limitations of all the disparate source systems and applications (other than SIS) run by these educational agencies to comply with the Ed-fi standard as well as the severely limited Ed-fi data model rendered Hoonuit’s proprietary solution as the only viable, feasible, and cost-effective option to help our customers realize their vision and goals of truly transforming learning and unlocking the power of ALL data.

Please explain in greater detail your proposed plan for securing SFUSD data as it moves to the cloud. For instance, if you are proposing a VPN, please specify the type of VPN you intend to use/recommend and what work you anticipate doing versus expect of the SFUSD project team.

• **System Level**—The database and application servers are secured at a system level in the operating system (OS) and in the database engine (DBMS). Following security best-practices, only network and system administrators are granted system level access. The applications themselves have system level logins and via this proxy account, all other users of the applications have access to the resources and data. There may be a desire or requirement for a small group of developers/designers to have direct access to the database. This is possible in the Hoonuit solution if it is managed properly. As a rule, very little security is applied at the database level in data analytics solutions: those who have direct data access have full access to the relevant schemas.

• **Application Level**—Most security definitions and administration will be performed at the application level. The Hoonuit Data Analytical Dashboard has comprehensive security models which allow for user- (or optimally role-) level definition of security at the object level. Security administration can be delegated in the Dashboard so that a district can administer the security for his/her users in a regional or state solution.

• Transfers of data between the Districts and the State are encrypted. We recommend transferring this data via a password-protected, compressed data file through an encrypted FTP tunnel (we support either FTPS or SFTP).

Please provide in detail, what level of initial capacity building and knowledge transfer (including documentation and staff training), as well as on-going support you are prepared to and are proposing to provide to the SFUSD project team in your proposed response. Specifically, please identify the individuals who will be responsible for that support, their experience with new Ed-Fi implementations, number of hours of support assumed/included in your proposal, and their availability to the project team (virtual/onsite, working hours).

• Training will be provided during implementation. Matt Riese, the project manager, will coordinate the provided training, as described below. Our team has extensive experience with our data model, which is a superset of Ed-Fi (along with CEDS and SIF).
• Training is provided through two-day, onsite train-the-trainer model during the implementation of the solution. Hoonuit’s standard technical training sessions include administration of the Hoonuit solution and customizing dashboards. A train-the-trainer approach is provided for an identified group of administrators and developers. The result of the training is a team of users who are able to confidently train larger groups of users, including staff, administrators, and teachers throughout the state.

• In addition to the training described above, complete documentation is included with every installation and enhancement. Included are comprehensive administrator and developer guides for the Hoonuit solution. All documentation is provided in electronic format, and kept up to date in an accessible online location for identified administrators and developers. Some items included within the technical guides are:
  o Infrastructure Considerations
  o Environment Installation and Configuration
  o Database
  o Dashboard
  o Reporting
  o Data Warehouse Build Procedure
  o Build Procedure Troubleshooting
  o Backup/Recovery
  o SIS Upgrade Considerations
  o Database Upgrade Considerations
  o Hoonuit Upgrade Considerations
  o Supporting Data Warehouse Administration Documentation:
    ▪ Infrastructure Worksheet
    ▪ Data Flow Diagram
    ▪ Metadata Diagram
    ▪ ERD Diagram

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- Windows and UNIX Example Automation Script
- Print Package Build Dependency Chart

- Web-based end-user training is embedded in the Hoonuit solution to guide an unlimited number of users. This training appeals to users of all levels, whether an advanced user who needs a reminder of what was previously learned or a new user who is just starting to explore the features of Hoonuit. Training videos are displayed in context with what the user is actively working on. For example, if a user is currently in the cohort feature, then he or she can click the help icon and videos related to building and using cohorts will be presented. Users can watch training and how-to videos without leaving the dashboard tool. Furthermore, the help feature includes search functionality for additional discovery of video content. The solution also has tooltips enabled throughout to help users understand the functionality of each button.

- Our maintenance program for SFUSD will include providing phone and email help desk support during business hours for five identified SFUSD developers. Additionally, we will be responsible for upgrades, maintenance, and bug fixes. Our online reporting tool allows these users to not only contact Hoonuit, but also track responses to the reported issue and access Hoonuit support documentation.
Detailed Overview of the Three Options

Option 1: Implement Hoonuit’s recommended comprehensive Data Management and Analytics Solution.

This proven solution across several hundreds of successful implementations in California and across the nation will allow SFUSD to meet every reporting requirement of their educators, staff, administration, leadership, and community, as well as state and federal compliance—now and into the future as their needs evolve. Our solution includes not only the necessary data acquisition, integration, transformation, cleansing, and blending to provide the right analytics, but also provides 100+ out of the box dashboards including those specific to LCAP, CAASPP, ELPAC, A-G, and other California requirements.
The Hoonuit enterprise data model aligns with standards such as CEDS and ED-Fi to enable seamless integration and flow of education data between various disparate education systems. That said, our data model includes thousands of additional data elements beyond these standards to fulfill a broader and more advanced set of analytical capabilities and data driven processes, such as:

- LCAP reporting, including closing the achievement gap with high expectations for all, access to a broad and challenging curriculum, reporting on suspensions, ELL, graduation indicators, ELA and Math state test scores, and more
- ESSA reporting, including school / district report cards, assessment analysis, post-secondary, ELL progression, chronic absenteeism, finance and allocation mechanisms, and more
- Early warning at-risk identification using predictive algorithms
- Intervention management
- Machine learning and statistical modeling to predict college and career readiness
- Early childhood education and longitudinal analysis
- Social and emotional correlations to academic outcomes
- Human capital management including staff credentials, qualifications, retention, absences, and more
- Prebuilt school / district performance improvement planning workflows for continuous improvement—including Title 1 plans, Safe and Healthy Plans, Sped, Technology Training, and more
- Per pupil spending, budget monitoring, expenditures, revenue, and other financial reporting
- District / school KPIs
- Surveys, such as school climate, social and emotional learning, and any others for students, staff, parents, and community
- Student health and wellness, including conditions, immunizations, and wellness screenings
- Geospatial analysis, including serviced-students analysis, boundary analysis for enrollment zones, chronic absences, program areas, and more.

The extensibility of our data model allows customer-specific entities to further support one source of truth across all their data—all in one central data warehouse. Our data model is relational in structure with clear key fields. Metadata is added to each table to track breadcrumbs / audit information, change log, processing dates, and source system lineage. As part of our application, we include our data model explorer that graphically represents the data model, connecting it to the visualizations within the dashboards and communicates all the fields and descriptions, while allowing you to profile the data without having to write SQL.
### Hoonuit Data Model Alignment with Ed-Fi

<table>
<thead>
<tr>
<th>Ed-fi Data Domain</th>
<th>Hoonuit</th>
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<tbody>
<tr>
<td>Alternative/Supplemental Services</td>
<td>Supported</td>
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<tr>
<td>Assessment</td>
<td>Supported</td>
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<tr>
<td>Bell Schedule</td>
<td>Supported</td>
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<tr>
<td>Discipline</td>
<td>Supported</td>
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<tr>
<td>Education Organization</td>
<td>Supported</td>
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<td>Enrollment</td>
<td>Supported</td>
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<tr>
<td>Finance</td>
<td>Supported</td>
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<td>Graduation</td>
<td>Supported</td>
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<tr>
<td>Intervention</td>
<td>Supported</td>
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<tr>
<td>School Calendar</td>
<td>Supported</td>
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<tr>
<td>Staff</td>
<td>Supported</td>
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<tr>
<td>Student Academic Record</td>
<td>Supported</td>
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<tr>
<td>Student Attendance</td>
<td>Supported</td>
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<tr>
<td>Student Cohort</td>
<td>Supported</td>
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<tr>
<td>Student Identification and Demographics</td>
<td>Supported</td>
</tr>
<tr>
<td>Teaching and Learning</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Hoonuit data model supports numerous additional data domains represented in the table above and beyond the Ed-Fi standard including at-risk indicators, graduation on-track and A-G classification, intervention practices, program membership, student growth, program attendance, student health and medical conditions, early childhood, social emotional, gifted and talented, post-secondary, high school graduation, diploma requirements, graduate outcomes, credit attainment, entrance exam readiness, college pathways, college readiness, college persistence, college completion, surveys, school climate, bussing and transportation, staff recruitment and evaluation, staff absence, staff qualifications and development, staff effectiveness, highly qualified, school / department metrics, purchasing, accounts payable, inventory, budgets and expenditures, spending and every other aspect of PK-12.
Hoonuit will support SFUSD in breaking down data silos and connecting disparate data from across the district to generate actionable, holistic student views that promote impactful decision making. Administrators, teachers, staff, and other authorized users can rely on Hoonuit to quickly compile reports reflecting data that shows trends from high levels, such as the entire district, down to groups or individual students.

Bring data together for valuable insights

The Hoonuit data management solution imports data from any structured, as well as unstructured data source, including student information systems (e.g., PowerSchool, Synergy, Infinite Campus, and more), financial systems, HR systems, food management systems, transportation management systems, assessments, as well as one-off auxiliary classroom files and data from other tools. Hoonuit can also scale to meet changing needs, whether it is a new Student Information System (SIS) or an assessment that needs to be represented for state requirements and visualized through comprehensive dashboards and reports.
Hoonuit’s Fully Managed Cloud Solution

- Single-tenant, dedicated hosting infrastructure
- 24x7x365 hands-on-keyboard systems monitoring with 99.99% up-time goal
- Operating and database management system updates, patches, and configuration changes
- Routine audits of systems and software, backups, and restores
- Installing and configuring new hardware and software
- Administering setup of active directory authentication
- Troubleshooting any reported problems and initiating and coordinating corrective actions
- Monitoring system performance and tuning the system
- Maintaining disaster recovery and business continuity plans and executing such plans in the unlikely event of a disaster

ETL & Source Systems

Hoonuit’s ability to bring together data from various systems is a complex process, as described in this section, but the results are seamless and reliable for users who rely on dashboards daily.

Hoonuit's ETL and assessment frameworks have been built from the ground up to scale to any platform, on-premise or cloud-based. To support scaling to any platform, Hoonuit has built ETL and Assessment frameworks that both operate independently of the database. This independence from the database allows Hoonuit's ETL and Assessments frameworks to leverage the database for what the database is best at—storing and retrieving data. Below is a list of some of the key features these frameworks were designed for.

- Source agnostic
  - Load data from any source
  - Student and school matching of source data (Assessments)
  - Source connectors extract source data into standard format
o Moving to or from a new source does not affect the data warehouse or ETL

- Database agnostic
  o ETL and Assessment process outside of database
  o ANSI standard SQL used to support different database providers
  o Database provider specific features still leveraged
    ▪ Proprietary database features are accessed via a wrapper (i.e., support for optional table partitioning)

- Platform agnostic
  o Deploy to on-premise or cloud
  o Cloud-based scalability allows for ramping up/down resources for both Database and ETL

To link the ETL and assessment frameworks together, Hoonuit has also developed an ETL engine called the Jesse ETL engine. This engine will allow both the ETL and assessment frameworks to access commonly shared components and separate the business rules and mappings from low-level file and database access API's.

**Jesse ETL Engine.** Jesse is Hoonuit's proprietary, Java-based ETL engine that is designed to support both ETL and assessment processing outside of the database. The Jesse ETL engine consists of core Java classes and some JavaScript utility modules that provide the ETL and assessment frameworks with methods to common low-level tasks such-as:

- Reading and writing files to disk or the cloud
- Reading and writing data to and from a database
- Provides the batching and queueing required to
  o Chunk work up into smaller workloads
  o Prevent bottlenecks at the source and target

Higher-level processes, like the Jesse ETL Framework and Jesse Assessment frameworks (as described below), leverage this single common ETL engine to handle core low-level tasks, including those listed above, which means both the ETL and assessment processes do not have to repeat that same code and logic to perform similar tasks.
The visual below represents Hoonuit's Jesse ETL process, how the Jesse ETL and Assessment Frameworks layer upon the Jesse ETL Engine, and how client customizations are stored separately to help increase the speed at which new Hoonuit product features and enhancements are deployed.

A key piece to supporting Hoonuit's ETL and assessment design of source-database-platform agnostic is to create a framework that can both scale and still be flexible for clients to customize and augment to fit their unique needs. To do this, the ETL and assessment frameworks support defining business rules in JavaScript modules (files), which means no compiling of code, etc., so it is easier and faster to customize while still supporting the separation of low-level ETL operations (handled in Java by Jesse ETL Engine) from high-level business rules (handled in JavaScript by ETL and Assessment frameworks).

At the core, Jesse is a Java scripting engine that leverages Java's next-generation JavaScript Engine for the JVM called Nashorn. Java's Nashorn compiles JavaScript code (i.e., the ETL and Assessment framework) into Java byte code for performance, and it is a key piece to unifying the Jesse ETL and Assessment frameworks.

**Jesse ETL Framework.** The Jesse ETL Framework consists mainly of JavaScript modules that perform the application specific tasks of loading a data warehouse (i.e., an implementation of the business rules and mappings defined to load a data warehouse table). The Jesse ETL Framework runs on-top of the Jesse ETL Engine and leverages the core components in the Jesse ETL Engine for pulling and pushing data to and from a source and target.

The Jesse ETL Framework can be thought of like a database stored procedure, where the ETL process for building and loading a data warehouse table is defined at a table and column level. Because the low-level Jesse ETL Engine can take care of reading and writing data to a database or file, only the business rules and mappings for defining how to set a tables column values are required. This simplifies the ETL process because only the business rules to define the column are stored in the framework, while the low-level table/file maintenance (e.g., inserts, updates, deletes, etc.) is handled automatically by the ETL framework and the Jesse ETL Engine.
**ETL Data Loading.** The following diagram provides a high-level workflow showing how the Jesse ETL Engine interacts with the Jesse ETL Framework to load a standard student file into the data warehouse.

![ETL Data Loading Diagram](image)

Referring to the numbers in the ETL Data Loading diagram above:

1. A standard student file is ready for processing
2. The Jesse ETL Engine handles reading the file into a dataflow
3. The dataflow is passed to the Jesse ETL Framework where each column’s business rules define what each record for the students table should be
4. A client provided an override to set the students school column to use their own business rules, so the Jesse ETL Framework does not use the standard mapping for student schools and instead uses the client provided mapping; this is an optional step and provided as an example of client customization
5. The Jesse ETL Framework passes the completed students table back to the Jesse ETL Engine (as a dataflow)
6. The Jesse ETL Engine handles loading the student table dataflow into the data warehouse (batching and queueing, inserting and updating where required)

**Jesse Assessment Framework.** The Jesse Assessment Framework consists mainly of JavaScript modules that perform the assessment specific tasks of loading an assessment file into the data warehouse. The Jesse Assessment Framework runs on-top of the Jesse ETL Engine and leverages the core components in the Jesse ETL Engine for pulling and pushing data to and from a source and target.

In the new Jesse Assessment Framework, there are additions to support our matching engine for every assessment. The matching engine verifies the student and school defined in the assessment record and matches it to the student and school from your SIS. This new matching process helps make sure that 1) all the student and school information is accurate, 2) the assessment is attached to the correct student and school, and 3) missing student and school information can be identified.
Our new approach to loading assessments also includes file matching (via an assessment signature) to quickly communicate whether the file format from the vendor has changed correctly or incorrectly from what was supplied in the past.

**Assessment Data Loading.** The following diagram provides a high-level workflow showing how the Jesse ETL Engine interacts with the Jesse Assessment Framework to load an assessment file into the data warehouse.

Referring to the numbers in the Assessment Data Loading diagram above:

1. An assessment file is ready for processing
2. The Jesse ETL Engine handles reading the file into a dataflow
3. The dataflow is passed to the Jesse Assessment Framework
4. From the dataflow, an assessment signature is detected so the Jesse Assessment Framework knows how to process the assessment (e.g., ACT, Star, etc.); additionally, it communicates whether the file format from the vendor has changed correctly or incorrectly (audits this case)
5. Any duplicate assessments, either from the currently processing assessment file or from previously loaded records for the same assessment, are removed and audited
6. A student’s school is detected based on supplied information in assessment file—else school information will be parsed from student matching process
7. The student is matched and identified before being approved for loading to the data warehouse—else record is audited and parked for further review
8. The Jesse Assessment Framework passes the completed assessment records back to the Jesse ETL Engine (as a dataflow)
9. The Jesse ETL Engine handles loading the assessment dataflow into the data warehouse (batching and queueing, inserting and updating where required)
Advanced Data Quality Monitoring

Along with the functionality described above, Hoonuit's solution provides SFUSD with an advanced data quality monitoring system that can be configured to your business rules and requirements. Listed below are a few highlights of this feature:

- Summary and stoplight display of all data quality items
- Pre-built data quality measures to choose from or define your own business rules to add to the Advanced Data Quality dashboard
- Click on any of the data quality measures to get the error definition, where to locate the errors in the source application, and exactly which records are causing the errors
- The dashboard can be viewed at the district level or down to the school, principal or teacher level showing their specific data quality issues
- The dashboard will update with every source data refresh to show progress towards fixing data quality issues

Sample Data Quality Business Rules

<table>
<thead>
<tr>
<th>Business Rule</th>
<th>Example Data Quality Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplicate Student Records</td>
<td>Description</td>
</tr>
<tr>
<td>Active CY Enrollment - No NY Enrollment</td>
<td>Identify students with active CY enrollments but missing a NY Enrollment Records</td>
</tr>
<tr>
<td>Non-Sequential Grade Level in NY Enrollment vs CY enrollment</td>
<td>Identify students with a NY enrollment record with a non-sequential grade level as compared to CY</td>
</tr>
<tr>
<td>Invalid Grade Level for School of Enrollment</td>
<td>Identify NY enrollment records where the student has a grade level identified that is invalid for the school of enrollment</td>
</tr>
<tr>
<td>OSS Disposition vs attendance totals</td>
<td>OSS Disposition Days total vs attendance record days total</td>
</tr>
<tr>
<td>Student grade level not within class grade range</td>
<td>Identify student class enrollments where the student's grade is not within the grade range of the section</td>
</tr>
<tr>
<td>Kinder half day absences</td>
<td>All KG grade level absences should total 1.0 for the day. Identify any KG student attendance days where they have absence records that are less than 1.05 days</td>
</tr>
<tr>
<td>Attendance class start dates need to match enrollment date</td>
<td>Attendance class start dates need to match enrollment date</td>
</tr>
<tr>
<td>Grade vs Age</td>
<td>Check grade level against predefined age range for grade level</td>
</tr>
<tr>
<td>Homebound</td>
<td>Check for homebound section included in attendance. All homebound sections should be set to &quot;Include in attendance&quot;.</td>
</tr>
<tr>
<td>Homebound</td>
<td>Check to ensure minutes are populated for each school week - shouldn't be blank during weeks of enrollment as homebound student</td>
</tr>
<tr>
<td>Students enrolled in inactive courses</td>
<td>Identify student class enrollments where the course being used by the section is no longer active</td>
</tr>
<tr>
<td>Proof of identity - Birth Verification Audit 30 day/10 day letters</td>
<td>Identify students without birth verification (30 day letter flag) - check against enrollment date - they get 30 calendar days - if nothing after 30 days then they get a 10 day letter, which adds 10 more days. If no response after 10 day notice letter then a letter to law enforcement is submitted and the verification type is changed to &quot;Law Enforcement Notified&quot;.</td>
</tr>
<tr>
<td>Chronic attendance vs Chronic Health Form Health Condition</td>
<td>Check for students with chronic absence reasons (CHR) in current year but no chronic health form health condition code</td>
</tr>
<tr>
<td>Students with no scheduled sections</td>
<td>Identify all active students that do not have any section enrollments</td>
</tr>
<tr>
<td>Enroll Activity - only a single enrollment activity record and that activity record has a previous grade exit code</td>
<td>This is caused by staff using the wrong process to correct a students grade level or incorrectly promote a student</td>
</tr>
<tr>
<td>Courses in use without a state course code</td>
<td>Identify all district courses that do not have state course codes assigned</td>
</tr>
<tr>
<td>Instructional setting doesn't match relating courses</td>
<td>Blueprint/iba instructional setting should have blueprint/iba courses</td>
</tr>
<tr>
<td>Gifted instructional setting compared to gifted service code</td>
<td>Ensure any student with a gifted instructional setting has a gifted service/need assigned</td>
</tr>
<tr>
<td>Incident Date doesn't fall within Fiscal Year</td>
<td>Date of incident should be within the date range of the school year it is recorded in</td>
</tr>
<tr>
<td>Incident Date is greater than referral date</td>
<td>Incident can't happen after a referral</td>
</tr>
<tr>
<td>Discipline incident missing location</td>
<td>All discipline incidents must have a location</td>
</tr>
<tr>
<td>Incident contains no offender</td>
<td>All discipline incidents must have an associated offender</td>
</tr>
<tr>
<td>Person can only be entered once per incident</td>
<td>The same student/individual cannot be listed more than one time on an incident</td>
</tr>
</tbody>
</table>
Hoonuit’s Advanced Performance Monitoring

- 24x7x365 hands-on-keyboard system monitoring including resource utilization, performance, availability and up-time
- Detailed analytics and reporting on usage by user, dashboards, metrics
- Detailed change log history by object modified timestamp, user etc.
- ETL build audits by source and location
- Metric and dashboard performance analytics including time taken to execute queries and load times
Option 2: Implement Hoonuit’s Ed-fi Solution.

This solution will allow SFUSD to meet requirements assuming the various source systems required to pull data from and become Ed-fi compliant per timeline proposed by SFUSD. Hoonuit will deploy the Ed-fi ODS along with a pre-built connector to the ODS to load Ed-fi data in the Hoonuit data warehouse. As a result, Hoonuit will be able to provide comprehensive reporting per attributes supported by the Ed-fi data model.
Option 3: Implement Hoonuit’s data warehouse and analytical solution once the Ed-fi solution has been implemented.

This solution will provide SFUSD the necessary denormalized data warehouse and reporting layer required to do comprehensive, high cardinality analytics including predictive modeling and machine learning as well as any data driven workflows on top of the Ed-fi ODS once it is implemented. Hoonuit has extensive experience with California’s LCAP and LCFF reporting requirements, supporting over 500+ schools and 500,000+ students including the Silicon Valley.

Our out of the box reports and flexible and extensible self-service platform has successfully allowed educators, administrators, leadership, and community to consume and build reports while taking advantage of our predictive modeling, machine learning, statistical analysis and data driven processes.