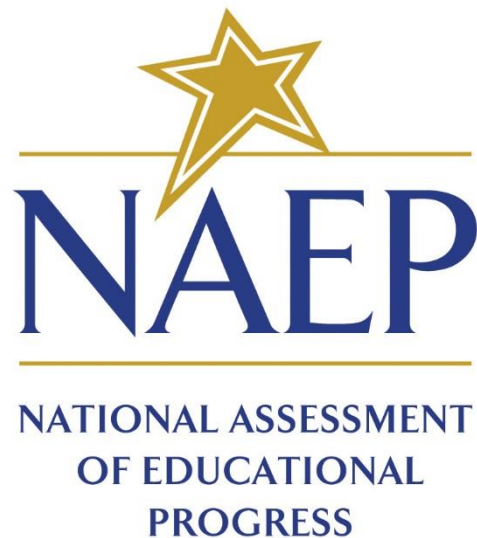


# Requirements / System Design Document

---



---

Education Statistics Support Institute Network (ESSIN)  
Education Visualization and Reporting Tool (EdVRT)

Version 4.0

June 15, 2019




OPTIMAL SOLUTIONS GROUP LLC  
ENABLING DATA-DRIVEN DECISION MAKING

**Company Sensitive and Proprietary  
For Authorized Use Only**

## Prepared by

---

Identification of Organization that Prepared this Document		
 <p>OPTIMAL SOLUTIONS GROUP, LLC REAL-TIME DATA-DRIVEN DECISION MAKING</p>	Organization Name	Optimal Solutions Group LLC
	Street Address	5825 University Research Ct.
	Suite/Room/Building	Suite 2800
	City, State Zip	College Park, MD 20740

DRAFT

# Revision History

---

Date	Version	Author	Authorize By:	Description
03/06/2017	.01	Michele Shaw, Vikesh Chahaun, Josh Bebee	Brian Cramer, Mark Turner	Initial Draft
05/01/2017	.02	Michele Shaw, Vikesh Chahaun	Brian Cramer	Updated with System Architecture diagram and narrative in Section 3.0 to reflect the AWS enviornment.
5/20/2019	.03	Sadaf Asrar Viskesh Chahuan Sarah Guile Brian Cramer	Brian Cramer	Revisions to NRT and added SART tool
6/15/2019	04	Sadaf Asrar Viskesh Chahuan Sarah Guile Brian Cramer	Brian Cramer	Revisions to NRT and added SART tool

# TABLE OF CONTENTS

1. Executive Summary .....	7
1.1 Document Organization / Traceability .....	8
1.2 Project Scope .....	8
1.3 References .....	8
2. Overall Description .....	8
2.1 Product Perspective .....	10
2.2 User Classes and Characteristics .....	12
2.2.1 EdVRT View User .....	13
2.2.2. EdVRT Contribute/View User .....	13
2.2.3. EdVRT Contribute/Edit/View User .....	13
2.2.4 EdVRT Adminstrative (Admin) User .....	13
2.2.5 EdVRT Super-Administrative (Super-Admin) User .....	14
3. High Level Technical Design .....	14
3.1 Assumptions / Constraints / Risks .....	16
3.2 Design Considerations .....	17
3.3 Systems Architecture Diagram .....	17
3.4 Hardware Architecture / Physical Design .....	18
3.5 Performance Design .....	19
3.6 Security Design .....	20
3.7 Internal Communications Design .....	20
4. System Features .....	21
4.1 Revelo Features .....	21
4.2 EdVRT Technical Requirements .....	24
4.2.1 Enter data/ Upload image(Single) .....	24
4.2.2 Bulk upload .....	25
4.2.3 Access Data via API .....	25

4.2.4 Search .....	25
4.2.5 Permission .....	26
4.2.6 Favorites .....	26
4.2.7 View and download multiple visuals.....	26
4.2.8 PDF download .....	26
4.2.9 User Management.....	26
4.2.10 Reports.....	27
4.2.11 DRM.....	27
4.2.12 SAEP .....	27
4.2.13 Testing.....	27
4.2.14 Documentation.....	27
4.2.15 Test/Production server access .....	27
5. Database Design.....	28
6. Data Requirements.....	28
6.1 Logical Data Model .....	28
6.1.1 List of Entity Types to be created.....	28
6.1.2 NAEP Results Data .....	33
6.2 Data Dictionary .....	34
6.3 User Groups .....	34
7. External Interface Requirements.....	35
7.1 Software Interfaces .....	35
8. Quality Attributes.....	35
8.1 Usability.....	35
8.2 Performance .....	35
8.3 Security .....	35
9. Internationalization and Localization Requirements .....	35
10. Other Requirements .....	35
Appendix A: Glossary.....	36
Appendix B: EdVRT Data Dictionary .....	38

# List of Figures

---

Figure 1: Revelo’s Real-time Framework.....	10
Figure 2: Features of Revelo.....	11
Figure 3: EdVRT Process Flow .....	12
Figure 4: EdVRT Key Capabilities .....	15
Figure 5: EdVRT Systems Architecture.....	17
Figure 6: EdVRT Systems Architecture.....	19
Figure 7: Internal Communications Design.....	20
Figure 8: Revelo Core Features .....	21
Figure 9: Revelo Added Features Features .....	23
Figure 10: Revelo Services .....	24
Figure 11: Revelo Physical Database/Model .....	28
Figure 12: Relationship Between Entity Types in EdVRT .....	33

DRAFT

# 1. Executive Summary

The Assessment Division (AD) of the National Center for Education Statistics (NCES) contracted Optimal Solutions Group, LLC (Optimal) to execute the Education Statistics Support Institute Network (ESSIN) Task 15: National Assessment of Educational Progress (NAEP) Technical Support for Secondary Analysis and Coordination. Optimal is tasked with providing technical support to AD in statistical analysis, research initiatives, project management, and coordination services. For Option Year 7, Optimal is tasked with maintaining and updating the system of tools comprising the Education Visualization and Reporting Tool (EdVRT), including the NAEP Reporting Tool (NRT) (task 4), the Dynamic Reporting Module (DRM) (task 4), and the State Assessment and Education Policy (SAEP) tool (task 6).

For each NAEP assessment, Optimal has been creating pre-release booklets containing displays of the results. In previous years, these booklets have been available to NCES in hard copy and PDF formats. Since Option Year 5, Optimal has put the data analyses from each NAEP assessment pre-release booklet into a web-based tool, the NRT, to allow users to quickly and more easily view and compare results across assessments. The NRT allows for more customizable searches of results and provides NCES staff with an additional way of viewing and analyzing the results. Some of the major features of the reporting tool include: viewing multiple visuals within and/or across assessments; emailing users with access to the tool to view findings; providing different levels of access to the tool for each user; searching the all images in the tool; downloading images as a PDF; exporting and printing capability; and a favorite search criteria for a user. The NRT is currently in version 2.0 and contains a newly developed DRM, which allows users to build customizable reports using data tables stored within the NRT.

The SAEP tool is a repository of state assessment and education policy information that users can use to query and analyze data. The data in this tool includes the names/consortia of state assessments, state assessment results, state assessment participation (include exclusion rates and sample sizes), content areas of state assessments, mode (paper and pencil, computer, tablet, etc.), who collected the state assessment data and more detailed specifics of the state assessment content (subscales, item distribution, etc.); and the adoption and/or implementation of particular policies at the national and state level.

This requirements/system design specifications document provides the software requirements for the EdVRT. This document is intended for Optimal Research Team, Optimal Analytics Development Team as well as any external stakeholders that are directly involved with the development and deployment of this tool. As approved by NCES, this document also captures the requirements and system design document essentials for EdVRT, including the technical system design from which the system has been built to fulfill the requirements specified in this document.

## 1.1 Document Organization / Traceability

- Section 2 provides a description of the EdVRT, including typical users of the tool and functions that will be performed by the tool.
- The high-level technical designs for the EdVRT are described in section 3, including the physical and systems architecture, security design, and internal communication design. Design considerations, as well as assumptions, constraints, and risks, are presented.
- The system requirements for EdVRT are provided in section 4. These requirements form the basis for building the specific instantiations of Revelo™ to address NCES' needs. As such, each requirement is traced to demonstrate that it is implemented in the delivered release as well as tested and verified prior to systems implementation.

## 1.2 Project Scope

The focus of this effort is to meet NCES' requirements for the EdVRT. Please refer to section 1.4 below for more details on the scope and limitations of each of the tools.

Tools within the EdVRT are tailored implementations of Optimal Solution Group's Revelo™ tool. This implementation builds on the existing Revelo codebase and adds additional functionalities that are described in the Product Perspective and System Features sections of this document.

## 1.3 References

List of external files or links that are relevant to this document:

- i. NAEP Reporting Tool FIPS 199 Document
- ii. NAEP Reporting Tool Privacy Impact Assessment

## 2. Overall Description

For NCES to ensure that the reports and briefings highlight the most important aspects of the assessment results, it is important for NCES staff to have an easy way to identify important stories in the NAEP assessment results. Although identifying which of the major reporting groups (e.g., race, gender, SD status, ELL status, and National School Lunch Program eligibility status) increased or decreased scores from the last assessment is a fairly easy task, it takes more time and effort to identify which subset(s) of these subgroups had the achievement gains. In addition, NCES staff often work under tight time constraints when trying to identify stories that will resonate with the public.

Moreover, during the 2012 "Future of NAEP" summit, one of the identified goals was to continue to serve as a leader in assessment innovation with regard to reporting results as new

technologies become available. The experts noted that NAEP reports serve as models for effective communication and are essential to the program’s success. As a result, one of the major suggestions was for NAEP to employ “dynamic data visualization tools to reach beyond the capabilities of static text, and [to] customiz[e] reports to meet the needs and interests of different users.”

To help NCES achieve its goals, Optimal used its Real-Time Framework to assist NCES in identifying important NAEP assessment results in the pre-release and briefing stages. Optimal created the NRT, which contains displays of NAEP assessment results. This tool allows users to select certain data analyses, customize the kinds of analyses to view, and generate displays quickly. The tool allows for more efficient reporting, easy access to NAEP data, and customized reporting and visualizations for the pre-release and release phases of NAEP assessment results. Moreover, users who are more comfortable with viewing the results on an electronic device (e.g., computer, tablet) would find this tool useful. The latest version of NRT, which is currently deployed, contains a new module called the DRM. The DRM is designed to allow users to produce more customized, informed, actionable, and presentation-ready reports for presentations and briefings.

As NCES continues to report on student achievement defined by the NAEP frameworks, changes to curricula and assessments at the state level have been occurring rapidly across the United States. Since the introduction of the Common Core State Standards (CCSS) in 2009, states have either adopted these standards outright or adopted a portion of these standards and modified the rest to fit their needs. Additional standards, such as the Next Generation Science Standards (NGSS), have also been adopted at the state level. Naturally as the curricula have changed, so have the state assessments. Computer-based assessments such as PARCC and SmarterBalanced are widely used. These changes to curricula and assessments have also resulted in changes to state level education policies. As NAEP continues to endeavor to represent what students know and can do across the United States, it is important that NAEP has the ability to collect data on changes occurring to curricula and assessments across the country. The SAEP module was developed with this in mind and will serve as an integrated system solution for linking, cataloging, and visualizing state level education data and NAEP data to help contextualize student achievement on NAEP. SAEP will systematically capture education policy at the state level, record student achievement in state assessments, contextualize NAEP scores through state education policy, compare student achievement as measured by state-level NAEP to individual state assessments, identify patterns by exploring trends using dynamic dashboards, and has the potential to develop and publish customized reports.

The NRT, DRM, and SAEP tools will be integrated into one analysis tool, the EdVRT, using Optimal’s Real-Time Framework. The benefits of using the EdVRT will include the ability to:

- Easily access a self-serving and querable repository and reporting tool for NCES to use to tell interesting stories about student achievement during pre-release briefings.
- Compare NAEP results to state assessment results and share this information with stakeholders and the broader public during pre-release and release events.
- Track student trends using pre-release data.
- Compare assessment policies and achievement levels across states.

- Act as a potential future public reporting tool of NAEP data and state data.

## 2.1 Product Perspective

Optimal has extensive federal experience with quantitative and qualitative methods in conducting evidence-based research and leveraging innovative technology tools, such as business intelligence software, which help to enable rapid-cycle analysis and reporting. Through its work on various projects, Optimal has developed Revelo™, a product for effectively collecting data across a range of content areas, cataloging and coding data collected based on standardized definitions and measures, and generating reports that efficiently summarize the main points of the data. Revelo™ is the baseline system that will be used to address all the EdVRT requirements. Overall Revelo is built on a systematic real-time framework that includes design (dark blue), data collection (orange), analysis (green) and reporting capabilities (light blue) as shown in Figure 1.

Some of the major features that Revelo™ offers includes ingestion, fuzzy matching, document workflows and approvals, document editing, email, report builders, granular searches and interactive visualizations. Revelo™ is modular and customizable and can integrate into agency systems and COTS tools as allowed by individual agency Authorization-to-Operate approvals. The RTF consists of toolsets of proven technologies, rigorous methods and streamlined processes to enable real-time, data-driven policy decision making. With this approach, Optimal can take a holistic approach in its requirements gathering, system customization, analysis and reporting, as well as training and ongoing support, seen in Figure 2. As a result, clients may use existing COTS tools or use Revelo™ or a combination.



*Figure 1: Revelo's Real-time Framework*



Modular end-to-end data, review and tracking platform

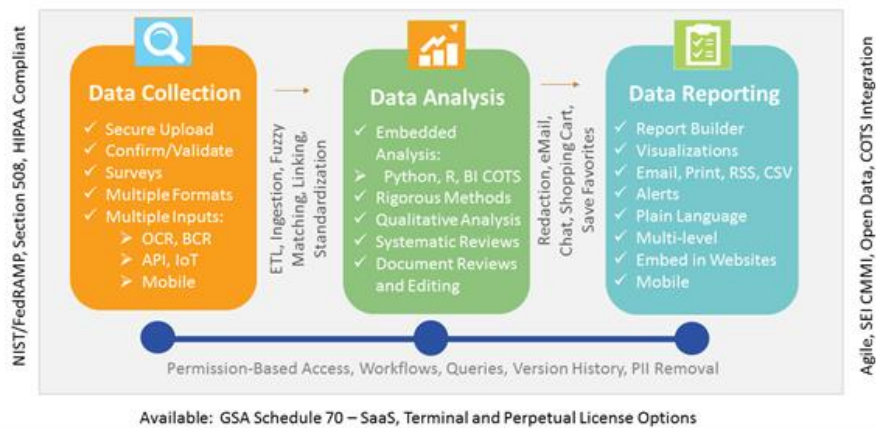
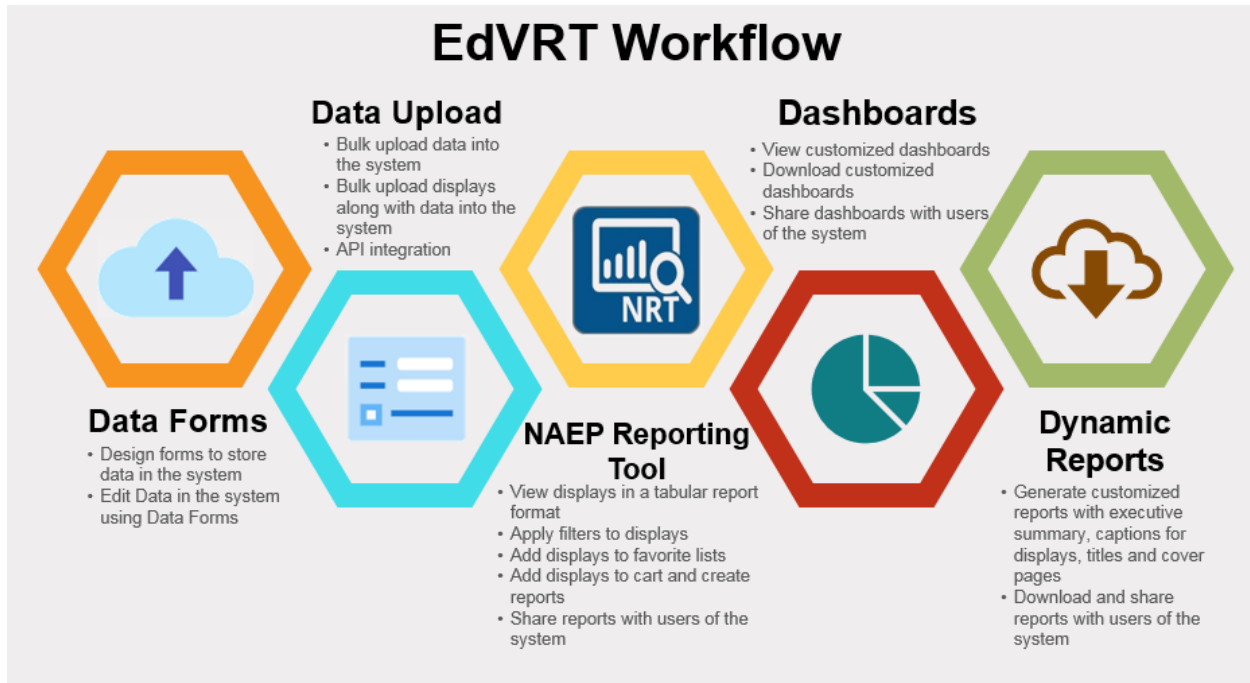


Figure 2: Features of Revelo

## EdVRT Product Perspective

As shown in Figure 3, the EdVRT Process Workflow, depending on their access authority, users can:

- Approve/disable users;
- Design or edit EdVRT data forms and reports;
- Upload data whether through a batch file or data forms;
- Edit and view the data for analysis;
- Download data;
- Generate administrative reports;
- Customize reports with executive summaries, graphic comments, titles, and cover pages.
- View customized dashboards and be able to filter as per user needs
- Ability to save and download customized dashboards, and share it with other users of the system



*Figure 3: EdVRT Process Flow*

Broadly, EdVRT provides access to approximately 60 primary users or roles at peak time. These may include:

- Administrators at Optimal;
- Contributor/Edit/View users at NCES;
- Contributor/View users at NCES and NCES contractors; and
- View only users at NCES and NCES contractors.

All users will access EdVRT through the NCES portal and will be assigned to a permission group based on the roles outlined above. While Administrators will have access to data for all booklets, subjects, and survey tools, Contributor/Edit/View, Contributor/View, and View only users may only have access to selected booklets, subjects, and/or other data products.

EdVRT's audit capabilities track all edits that are made to the data and these edits are compiled in an audit log. Administrators have access to administrative features such as user management, form editing, and reporting building. In case needed, more user groups can be created to further restrict data access as per NCES needs to accommodate and monitor .

## 2.2 User Classes and Characteristics

EdVRT manages access permissions to protect the privacy and integrity of EdVRT data. There are four user roles, each with associated access permissions.

### 2.2.1 EdVRT View User

EdVRT View Users include NCES staff and NCES contractors, and these users have access to the following functions:

- **Build, save, and download reports** - Users can build customized reports and save the report within the system to view at a later time. Users can also download the reports and share it with other users of the system.
- **View and download dashboards** - Users can view and download interactive dashboards.
- **Build and customize reports using the DRM** – Users can build customized reports; write titles, executive summaries, comments on figures, and customize cover pages. Users can download the reports.

### 2.2.2. EdVRT Contribute/View User

EdVRT Contribute/View Users include selected NCES staff and selected NCES contractors, and these users have access to all functions that EdVRT View Users have, with the addition of the following functions:

- **Submit data** - Users can submit data by either uploading the Data Collection Template through the *Data Import* function or by entering data through forms. Users can also upload supplementary documents through the *File Upload Data* function.

However, these permissions may only apply to the specific booklets, subjects, and data products that the user is associated with.

### 2.2.3. EdVRT Contribute/Edit/View User

EdVRT Contribute/Edit/View Users includes selected NCES staff, and these users have access to all functions that NRT Contribute/View Users have, with the addition of the following functions:

- **Edit data** - Users can edit data.

However, these permissions may only apply to the specific booklets, subjects, and data products that the user is associated with.

### 2.2.4 EdVRT Administrative (Admin) User

EdVRT Administrative (Admin) User includes NCES System Owners and selected Optmal users and these users have access to all functions that EdVRT Contribute/Edit/View Users have, and are able to perform these functions across all booklets, subjects, and data products.

### 2.2.5 EdVRT Super-Administrative (Super-Admin) User

EdVRT Super-Administrative (Super-Admin) Users includes users from Optimal and these users have access to all functions that EdVRT Admin Users have, across booklets, subjects, and other data products, with the addition of the following functions:

- **Manage Users** - Manage who has access to the system by adding new users, editing existing user profiles, and removing users from the system.
- **Manage Entity Types** - Manage the types of data that can be entered in the system by uploading code for new types of data, revising or replacing existing code, or removing existing data structures from the system.
- **Manage Questions**- Manage the data elements, or fields, for each type of data that is housed within the system.
- **Manage Hierarchies** - Manage the hierarchy of the system's database.
- **Manage Permissions** - Manage what data each user has access to.

## 3. High Level Technical Design

The EdVRT high-level technical design includes a web application for data collection and reporting and a database. Overall, the high-level technical design maps to the EdVRT key capabilities is depicted in Figure 4.

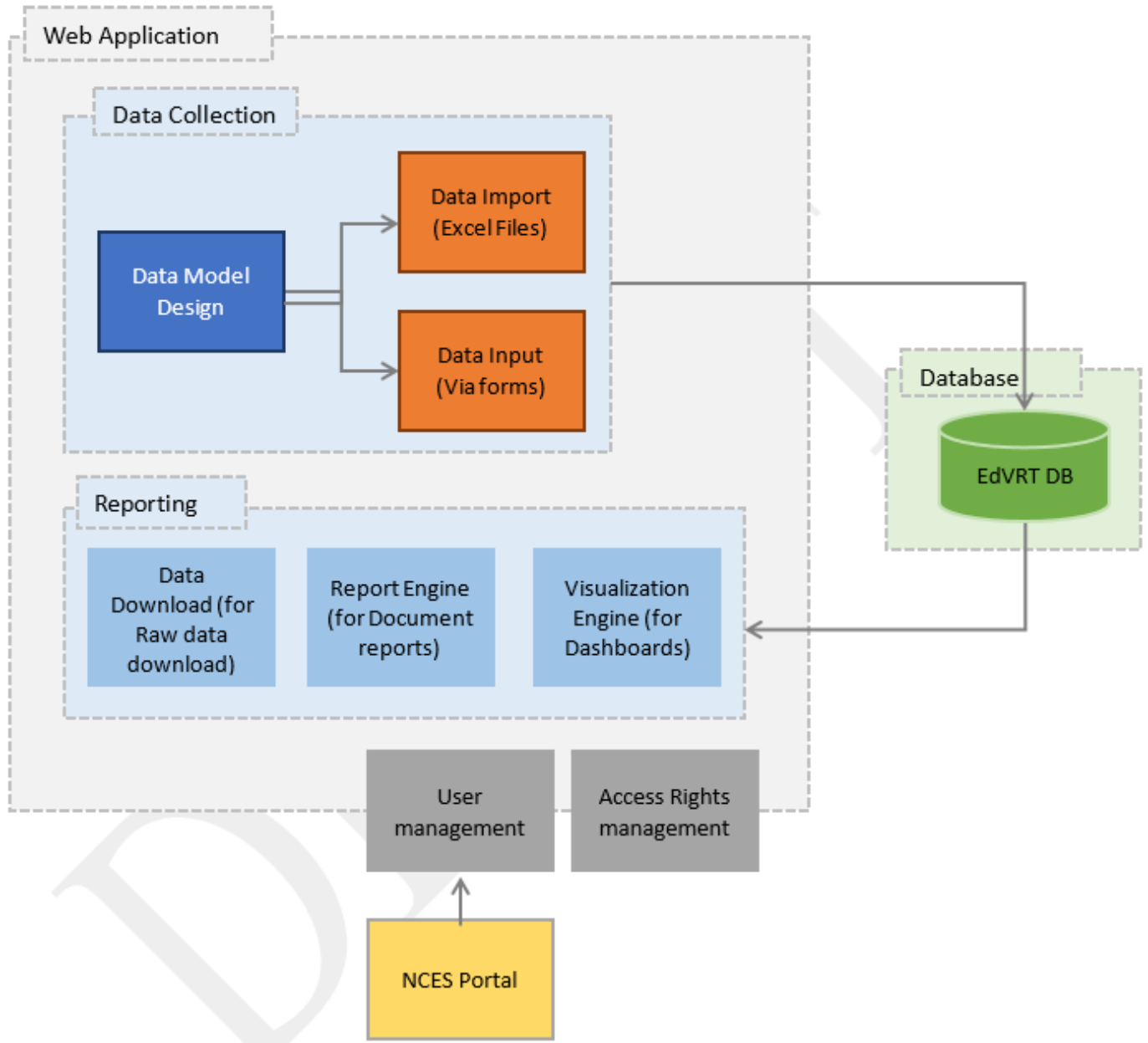


Figure 4: EdVRT Key Capabilities

In general, data design is performed by system administrators to create various entity types in the EdVRT system. Once entity types are established data collection occurs via either an upload using an excel file or through data input using the designed entity form. All EdVRT data, including the NRT, DRM and SAEP modules, are captured in the same database. The database supports the other EdVRT functions including data download through a web interface, as well as data analysis and reporting by end-users. Access to the EdVRT will occur through the existing NCES portal.

### **3.1 Assumptions / Constraints / Risks**

The following assumptions or dependencies regarding the EdVRT system, software, and its use have been identified:

- The EdVRT will be hosted on the public Amazon Web Services (AWS) environment currently managed for NAEP by Fulcrum.
- AWS is currently a Software as a Service (SaaS) environment that uses RDS instances for the database.
- NCES prefers a single sign-in approach for EdVRT through the NAEPIMS.Org (currently [www.NAEPIMS.org](http://www.NAEPIMS.org) and moving to [NEAP.Ed.gov](http://NEAP.Ed.gov)).
- Although Revelo (EdVRT) currently uses multi-factor authentication using Google, the preferred approach for EdVRT is sign-in via NAEPIMS.Org uses Microsoft Security Token Service.
- A SMTP relay server that has a return address at NAEP is currently available for use by EdVRT, as needed.
- For virus scanning, the AWS environment currently uses Windows Defender to scan data on persistent storage in the system.
- Amazon quick insights is available in the AWS NRT environment, however other Business Intelligence tool licenses would need to be purchased for EdVRT, if required.
- EdVRT connects with Tableau hosted in NCES's environment for dashboards. The availability of dashboards depends on the availability of the Tableau server hosted in NCES's environment
- Any downtime to Tableau server will affect dashboards of EdVRT.
- Optimal expects their developers to get access to the Tableau Server hosted in NCES's environment to create dashboards.

The following risks associated with the system design and proposed mitigation strategies have been identified:

- Since EdVRT uses, as a baseline, the Revelo Commercial-off-the-shelf (COTS) product that will be customized for this implementation, any updates to the system will require support from Optimal Solutions Group, LLC.

### 3.2 Design Considerations

Given that Revelo™ is a COTS product, there are no software design issues which need to be addressed or resolved before building the solution; however, integration requirements with the NCES portal have been defined and should be considered in the verification and validation activities. See Section 3.1 Assumptions / Constraints / Risks.

### 3.3 Systems Architecture Diagram

Currently, NAEP Program/Application Systems exist in 2 separate environments: a private Tier 1 cloud and a public cloud on Amazon Web Services (AWS ). Given the EdVRT application scope, NCES has decided to put EdVRT in the AWS public cloud.

As depicted in Figure 5, EdVRT users will be authenticated in the NCES portal and granted access into EdVRT. EdVRT will include a Web Application server that connects to an RDS instance located in Fulcrum’s AWS environment. Although Revelo (EdVRT) currently uses SQL Server 2014, Optimal completed testing and will implement Revelo using an RDS instance.

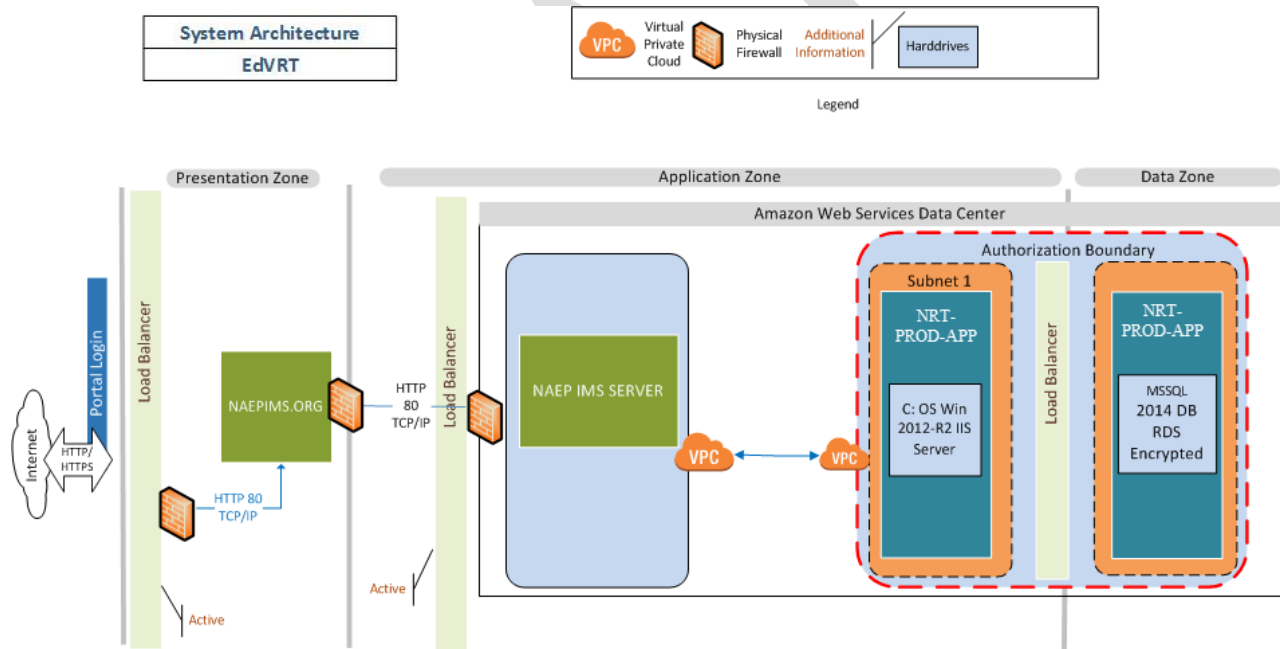


Figure 5: EdVRT Systems Architecture

### 3.4 Hardware Architecture / Physical Design

The physical design requirements for EdVRT are listed below given the expected hardware architecture required to support the NCES staff, contractors, and administrator utilizing the EdVRT application. Three environments are needed – Development, Validation, and Production. Development will be set up so that Optimal will have Administrative access to this box, specifications to be determined. Validation and Production will have the same configurations.

#### **Production Application Server (NRT-PROD-APP)**

Operating System: Windows Server 2012 R264 bit; M4Large instance with 4 Cores and 16 Gb RAM  
Ports: HTTP 80, SQL 1433  
Software installed: IIS 8.5, .NET Framework.  
Window Server Role: Web Server (IIS) and File Services  
Network Connectivity: Default 250 Gigabyte Bandwidth  
Monitoring Tool (xxxxxx)

#### **Production Database RDS Instance (NRT-PROD-DB)**

Software installed: MS SQL Server 2014  
RDS Size: 300 Gb  
Network Connectivity: Default 250 Gigabyte Bandwidth  
Ports: SQL 1433  
Monitoring Tool (xxxxxx)

#### **Validation Application Server (NRT-VAL-APP)**

Operating System: Windows Server 2012 R264 bit; M4Large instance with 4 Cores and 16 Gb RAM  
Ports: HTTP 80, SQL 1433  
Software installed: IIS 8.5, .NET Framework.  
Window Server Role: Web Server (IIS) and File Services  
Network Connectivity: Default 250 Gigabyte Bandwidth  
Monitoring Tool (xxxxxx)

#### **Validation Database RDS Instance (NRT-VAL-DB)**

Software installed: MS SQL Server 2014  
RDS Size: 300 Gb  
Network Connectivity: Default 250 Gigabyte Bandwidth  
Ports: SQL 1433  
Monitoring Tool (xxxxxx)

## Assumptions

30 simultaneous users, 60 peak capacity

Assumes separate development, validation and production environments

Validation and Production are configured identically

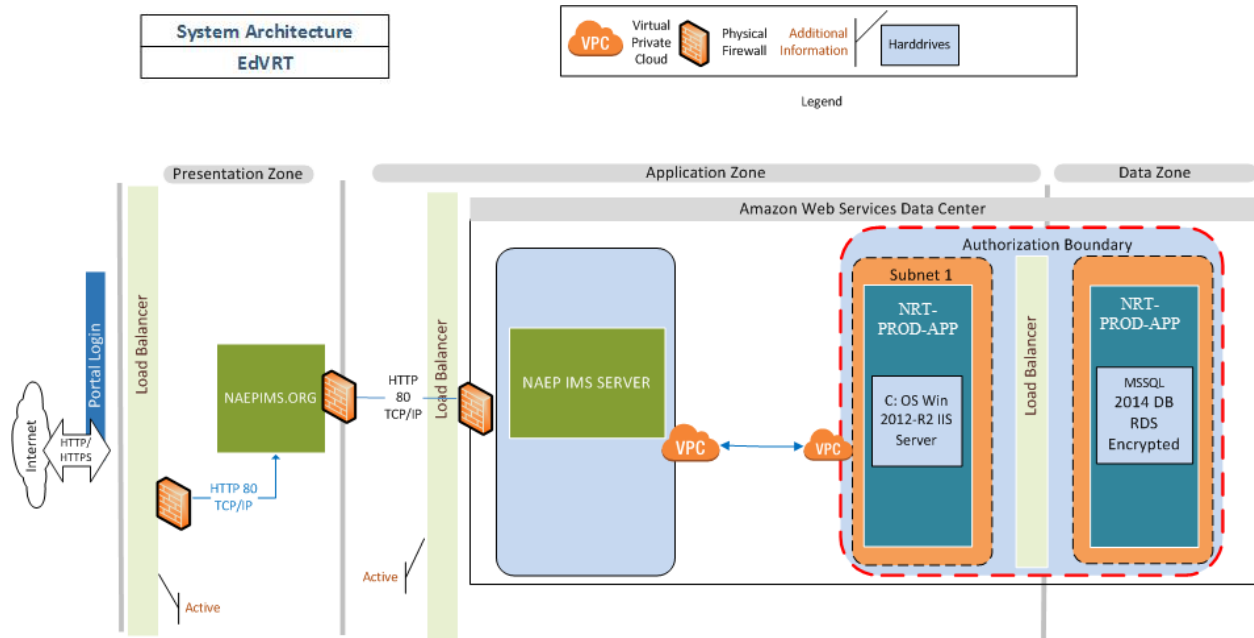


Figure 6: EdVRT Systems Architecture

## 3.5 Performance Design

EdVRT's primary capability will be to store and manage NAEP assessment results that can include thousands of displays in the form of graphic files e.g., jpg or .png). It is estimated that on average these displays can be around 150KB and the Math and Reading Assessment for 2018 is expected to have approximately 20,000 graphics / displays. Storage requirements alone for this initial assessment are expected to require ~3GB. Additional storage space will be required to store custom reports and dashboards created by users through DRM and SAEP modules. SAEP's primary capability will be to link and catalog state assessment and education policy data.

For reports generated with a large number of images in it, the system might take a while to create reports with tens and hundreds of images. For e.g., if a report is generated with more than 50 images, it might take couple of minutes to be generated.

EdVRT is expecting to up to 30 simultaneous users.

### 3.6 Security Design

EdVRT will include several security integrity controls including:

- Roles authentication;
- Auditing logs and events;
- Vulnerability testing;
- Continuous Monitoring; and
- Independent Secure Programming Review.

In addition, NAEPIMS Portal icon will be security trimmed to an AD Group where Optimal defines the users working with NCES. Optimal will use local application groups consisting of AD users to control authorization within the application

### 3.7 Internal Communications Design

Internal communications between the NCES Portal that performs user authentication and to the EdVRT to be provided by Fulcrum

Security Token Service (STS) Authentication

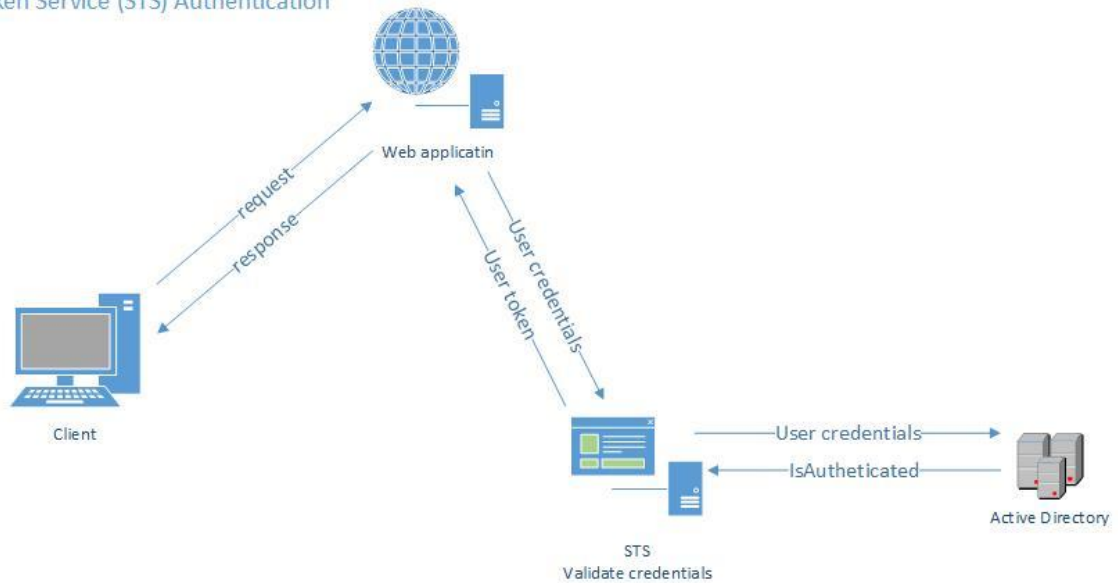


Figure 7: Internal Communications Design

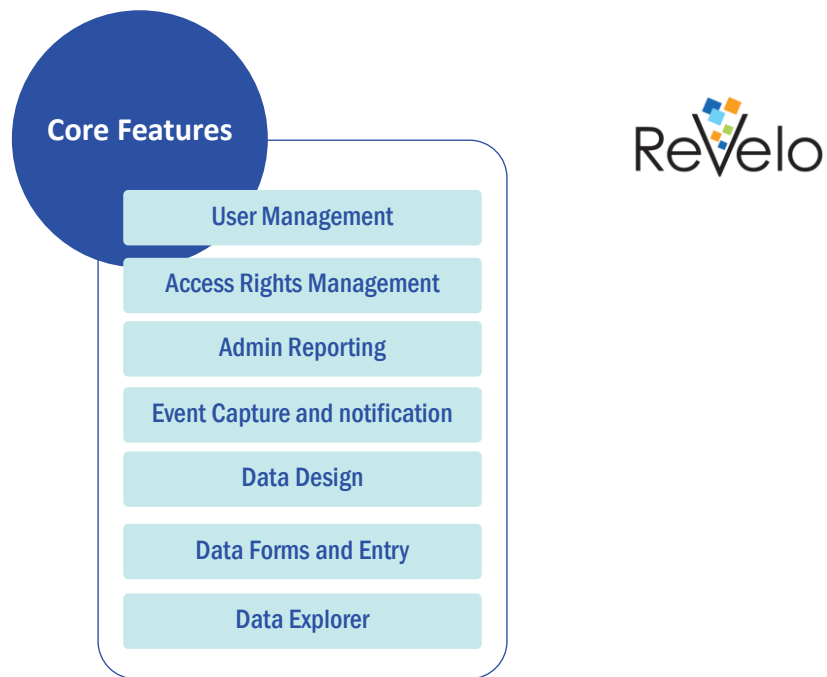
## 4. System Features

Revelo is Optimal’s proprietary software application. It is a modular web-based data collection, analysis, and customized reporting tool that can be implemented out of the box on a variety of projects in order to collect, analyze and report on different types of data. Revelo allows users to harmonize and create open data, and disseminate analysis in a user-friendly customizable web interface.

The following sections provide an overview of the Revelo features, EdVRT specific requirements, and how they relate to each other.

### 4.1 Revelo Features

Revelo’s architecture provides a framework that includes core features for all customers, as shown in Figure 8.



*Figure 8: Revelo Core Features*

The Core Features include:

- User management – Provides administrators with the ability to manage Revelo user accounts including functions like add and delete user, edit user information, activate and deactivate user, reset locked out users accounts, enabling multifactor authentication, etc.;
- Access Rights Management – Provides administrators with the ability manage access rights of users including create, enable and delete user groups, as well as add and edit hierarchies which specify group access rights on various Revelo features. In addition users can define and manage group access for individual web-pages;
- Admin Reporting – Administrators of Revelo have access to many different reports and logs to maintain Revelo. For the Revelo core these include:
  - Build Log;
  - Login Log;
  - Long Login Log;
  - User Status Report;
  - Group Permissions Change Log;
  - File Upload Log;
  - File Download Log;
  - View Ingested Data;
  - View Duplicate Answers Report;
  - View Password Changed Log;
  - View User Accounts Enabled/ Disabled Log;
  - View User Accounts Locked/ Unlocked Log;
  - View Data Import Log;
- Event Capture and Notification – Reports and events can be captured and admins can create notifications for those events;
- Data Design – the process of producing a detailed data model of database;
- Data forms and entry – Text formatter, incremental time question, question order randomizer, picture in question and answers; and
- Data explorer – search feature allows for data to be explored and extrapolated;
- Customized report development – add cover page, graphics, analytical text, executive summaries, headers;
- Dynamic data visualization – build a user specific dashboard given data in the data explorer using Tableau.

In addition to the “out of the box” or core features, Revelo can be customized to incorporate the following added features as shown in Figure 9.

Enhancements  
&  
Added Features

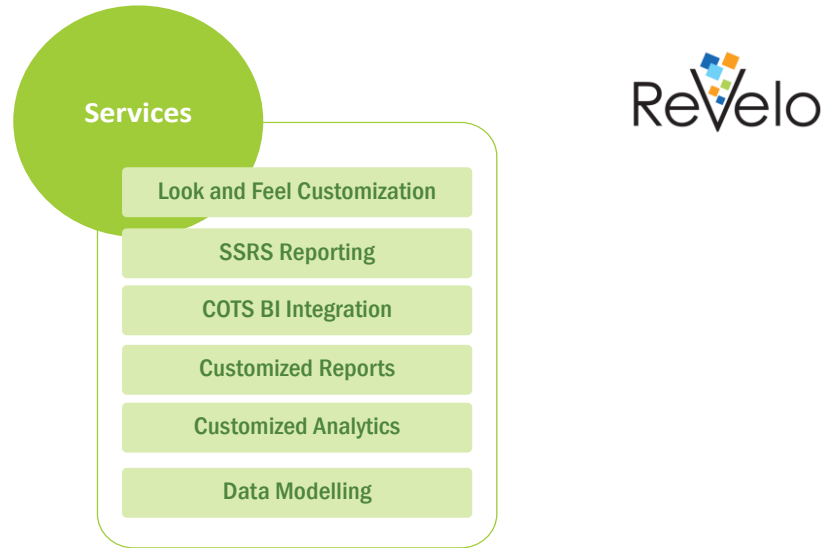


Figure 9: Revelo Added Features Features

Enhancements and added features include, as seen in figure 9:

- Workflows – creating workflows to define the sequence of events (create, review and approval) for Revelo events;
- Email notification – setting up users that should receive email notices upon completion of certain Revelo events;
- Multi-language support – supporting different languages;
- Calculated columns – adding calculated columns to reports so arithmetic functions can be performed on data within reports provided in the Data Explorer core feature;
- Artifact management – providing a file repository for searching and displaying image files as in the EdVRT;
- Document Data Mining – extracting text data from documents based on patterns entered by the user;
- Data Import – importing data through excel files using queue;
- Mutli-Factor Authentication – controlling access through the entry of multiple pieces of information, like a Revelo login and mobile phone for verification purposes;
- Fuzzy Matching – identifying and merging of entities using fuzzy matching;
- Group Hierarchy – defining a hierarchy of user groups so that user groups can inherit permssions given the hierarchy;
- ETL and Ingestion – extract, transform and load data including ingestion;
- Data Analyzer – searching for a specific text string in documents (MSWord and .pdf files); and
- API Services – Subroutine definitions, protocols, and tools to support application programming interfaces (API) and building application software.

The EdVRT is a customized implementation of an added feature in Revlo. Specific requirements for EdVRT are provided in Section 4.2, EdVRT requirements.



*Figure 10: Revlo Services*

One other aspect of Revlo is the ability for customers to obtain services where a services may include the items depicted in Figure 10.

## 4.2 EdVRT Technical Requirements

### 4.2.1 Enter data/ Upload image(Single)

Enter/Upload data allows users to enter a single row of information. This module should have the following functions:

1. Ability to create new categories-
  - Admin users should have the permission to add new categories for users to upload metadata for the images. This option is not available for non-admin users.
  - The system should not allow admin users to create categories with the same name. The validation check should not be case sensitive.
  - A category can be mandatory.
  - A category should be editable.
2. Ability to add choices to the categories-
  - Admin users should also have permission to add choices to the categories created as metadata for the upload images. The users will use these choices as metadata information for the uploaded image.
  - This option is not available for non-admin users.
  - Choices should be editable.

3. Upload image-
  - Users should be able to upload images with metadata information. The metadata information includes selecting various categories and respective choices for the image being uploaded.
  - The metadata information would be stored in the database and the image will be store as a file on the server.
  - The image type supported would be JPEG and PNG.

#### **4.2.2 Bulk upload**

1. Validation-
  - A configuration file will be uploaded with metadata information for bulk upload feature.
  - A zip file will also be uploaded containing images of the respective data in the configuration file.
  - The system would validate the configuration file for categories and choices. In case any category or choice does not exist in the system, an error will be generated.
  - The system would then unzip the files on the server and then check if all files described in the configuration file exists.
2. Upload-
  - Once all data is validated, the system would upload the data and save it to database.
  - The system would notify user about success/failure.
  - All errors will be displayed at once.
  - The user would re-upload the files in case of any errors.

#### **4.2.3 Access Data via API**

The EdVRT system will leverage the Nation's Report Card data Service API to access data on NAEP results in a machine readable format for analysis and reporting. Sepecifically, the syetm will conduct the following operations:

- Access the API for the embargoed NAEP results data using account credentials
- Send queries for returning pre-defined NAEP data requests
- Covert the data from its native .JSON format to .CSV format
- Clean the .CSV data to meet the normalized structure and format to be loaded on to the EdVRT database
- Load the normalized data in the EdVRT database

#### **4.2.4 Search**

Searchability would help the users to filter based on a particular choice/choices from a single or multiple categories and display the result to the users. This feature can be implemented using jQuery datatables or using angular ui-grid.

#### **4.2.5 Permission**

- Admins will be able to assign permission based on user groups.
- A predefined set of permissions will be created based on modules of the system.
- The predefined set can be modified and changed based on requirements from NCES.
- Admins will be able to provide permission to users at a granular level, providing more flexibility.

#### **4.2.6 Favorites**

- Users should be able to favorite their filter selection or a particular row. Favorites for each user should be saved in the database.
- Users can see all their favorites through a user interface.
- User should be able to send their favorites option to other users of the system.
- A notification would be sent to receiver the receiver and the receiver will see notifications as soon as he/she logs in (check for real time notifications).
- Favorites user interface would let user filter favorites received from other users and its own favorites list too.
- A user should able to edit their favorites list.

#### **4.2.7 View and download multiple visuals**

- By selecting any row, the selection will be added to the cart.
- Users can add multiple selection to the cart.
- The items in the cart can be dragged in the sequence the user would want to view.
- By clicking “View Display button,” a pop up would open displaying all images in the sequence user arranged.
- User will be able to edit items from the cart.
- Users should also be able to download the images of the items in cart in pdf format from the view display pop up.

#### **4.2.8 PDF download**

- User should be able to download all images in PDF format through view display pop up.
- User should also be able to download annual booklets available to them on the user interface.

#### **4.2.9 User Management**

- Admins will be able to create new users for the system.
- Each user will belong to a particular user group and each user group will have specific permissions.
- A password policy for user accounts will be provided.
- User will login using email address as username.
- System should have a feature to disable users.
- Admins should be able to reset password for users of the system.
- A password reset email link will be sent to the user to reset their password.

#### **4.2.10 Reports**

- User login report;
- Bulk upload report; and
- User account activity report.

#### **4.2.11 DRM**

- Ability for Users to create custom reports across multiple subjects, grade and other filter options
- Users can only preview data they have access to
- Users will be able to provide custom description to every image selected as part of the report
- Users can also provide Executive summary, Author and Date information for the report generated
- The report generated will include table of contents and users will be able to select a template for the report to be generated with.
- The report will be downloaded in .docx format

#### **4.2.12 SAEP**

- New dashboards will be created in Tableau (No of dashboards and their specifications TBD)
- Users will be able to filter data as needed based on the filters provided
- Users can download their custom dashboards and data in pdf and csv/xlsx format (TBD)

#### **4.2.13 Testing**

The tool will go through a series of testing before deployment. The different types of testing include:

- Smoke Testing;
- Functional Testing;
- Regression Testing;
- End to end Testing; and
- Performance/load Testing.

#### **4.2.14 Documentation**

A manual would be available for users, which would help them learn the system.

#### **4.2.15 Test/Production server access**

For deployment, the application would need a two-server pair configuration. Application code would be deployed on one of the server, and the database on the other. Two environments for the above server pair architecture would need to be set up, one for testing and other for production

## 5. Database Design

### Physical Database/Model

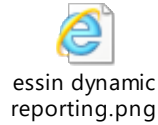


Figure 11: Revelo Physical Database/Model

## 6. Data Requirements

This section describes various aspects of the data that the system will consume as inputs, process in some fashion, or outputs.

### 6.1 Logical Data Model

The EdVRT does not require a logical data model because the system is a COTS solution with a standardized physical data model and a meta logical data model that does not map to the physical data model.

#### 6.1.1 List of Entity Types to be created

The table below summarizes the entity types of the system, and figure 12 below depicts the relationships between the entity types.

Table 1: Entity Types to be Created

#	EdVRT Entity Type	Entity Type Description	Entity Type Unique Combination Field IDs/User Unique IDs (Fields that make a record unique)	Entity Type Unique Combination Field Labels/Question Labels
1	Table Data1	Meta-data to record data tables associated with an assessment	Q1	Name
			Q2	AssessmentYear
2	Categories	Meta-data to create categories for reporting assessment scores, e.g., subject, grade, state, etc.	Q1	Category Name

#	EdVRT Entity Type	Entity Type Description	Entity Type Unique Combination Field IDs/User Unique IDs (Fields that make a record unique)	Entity Type Unique Combination Field Labels/Question Labels
3	Identifiers	Meta-data to add choices to each category for reporting assessment score, e.g., identifiers for the category grade would 4, 8, 12.	Q1	Select Category
			Q2	Identifier Name
			Q3	Identifier ID
4	Mode of State Assessment	Meta-data to create mode of state mathematics assessment for various years	ModeOfStateAssessment1	State Name
			ModeOfStateAssessment2	Assessment Period
			ModeOfStateAssessment3	Assessment Name
			ModeOfStateAssessment4	Grade
5	Common Core State Standard Adoption	Meta-data to create whether states adopted Common Core	StateEdStandard1	State Name
6	Year	Meta-data to create the calendar year in which the assessment was administered	Year100	Year (YYYY)
7	School Year	Meta-data to create the academic year in which the assessment was administered	SchoolYear100	School Year(YYYY-YYYY)
8	Grade	Meta-data to create the entry for the grade at which the assessment was administered	Grade100	Grade
9	State	Meta-data to create the	State100	State

#	EdVRT Entity Type	Entity Type Description	Entity Type Unique Combination Field IDs/User Unique IDs (Fields that make a record unique)	Entity Type Unique Combination Field Labels/Question Labels
		entry for the state for which the assessment was administered	State200	State Abbreviation
			State300	State FIPS code
10	County	Meta-data to create the entry for the county at which the assessment was administered	County100	State
			County200	County
			County300	County FIPS code
11	Assessment type	Meta-data to create the entry for the type of assessment that was administered	AssessmentType100	Assessment Type
12	Assessment Subtype	Meta-data to create the entry for subtypes within assessments that were administered	AssessmentSubtype100	Assessment Type
			AssessmentSubtype200	Assessment Subtype
13	District	Meta-data to create the entry for the district at which the assessment was administered	District100	State
			District200	County
			District300	CCD District
14	NRT Report	Meta-data to record individual analysis for a given publication	NRT_Tool_1	Publication Title
			NRT_Tool_2	Publication Number
			NRT_Tool_3	Publication Date
15	Assessment	Meta-data to create and record the entry for	Assessment1	Assessmnet Name

#	EdVRT Entity Type	Entity Type Description	Entity Type Unique Combination Field IDs/User Unique IDs (Fields that make a record unique)	Entity Type Unique Combination Field Labels/Question Labels
		different assessments that were administered		
16	Assessment Consortia	Meta-data to create the consortia associated with assessments that were administered	AssessmentConsortia1	Assessment Consortia's Name
			AssessmentConsortia2	Description of Consortia
			AssessmentConsortia3	Consortia's Websites URL
			AssessmentConsortia4	Consortia's Strategic Goal
17	School types	Meta-data to create the entry for the type of school at which the assessment was administered	SchoolType1	School Type
18	Major Groups	Meta-data to create the major reporting groups to tag the individual analysis	MajorGroups1	Major Groups
19	Assessment Period	Meta-data to create and record the background assessment information for a given period and the corresponding assessment finding for that period	AssessmentPeriod1	Assessment Name
			AssessmentPeriod3	State
			AssessmentPeriod4	Jurisdiction
			AssessmentPeriod5	School Years Assessment Administered
			AssessmentPeriod10	Assessment Grade
20	Changes in Assessment Administered	Meta-data to record the year to year changes in the administration of each assessment	ChangesInAssesmentAdministered1	Select Previous Assessment Year
			ChangesInAssesmentAdministered2	Revised Assessment Year

#	EdVRT Entity Type	Entity Type Description	Entity Type Unique Combination Field IDs/User Unique IDs (Fields that make a record unique)	Entity Type Unique Combination Field Labels/Question Labels
21	State Education Policy	Meta-data to record state level education policy	StateEducationPolicy1	Is this policy or legislation tied to an overarching federal policy or legislation
			StateEducationPolicy2	Select State enacting the Education policy or legislation
			Enter the name of the state's Education policy or legislation	Enter the name of the state's Education policy or legislation
			State's Education Policy Name	State's Education Policy Name
22	Federal Education Policy	Meta-data to record federal education policy	FedEducationPolicy1	Education Policy Name
23	Education Policy Demonstration	Meta-data to record specific education policy demonstrations	EduPolDemo1	Education Initiative Type
			EduPolDemo2	Is the Overarching Education Policy Federal Or State
			EduPolDemo3	Select The State Overarching Education Policy
			EduPolDemo4	Select The Federal Overarching Education Policy
			EduPolDemo7	Education Initiative Title
			EduPolDemo16	Education Policy implementation status
			EduPolDemo18	Education Policy implementation status
24	Assessment Score	Meta-data to create the levels of profeciency score as well as record the actual assessment score for a given assessment administration	AssessmentScore1	Assessment Period
			AssessmentScore2	What Assessment Type was Administered for this period?
25	FileData	Upload any file in the system	Name	Name
			File	File

The figure below illustrates the relationship of the entity types within the system.

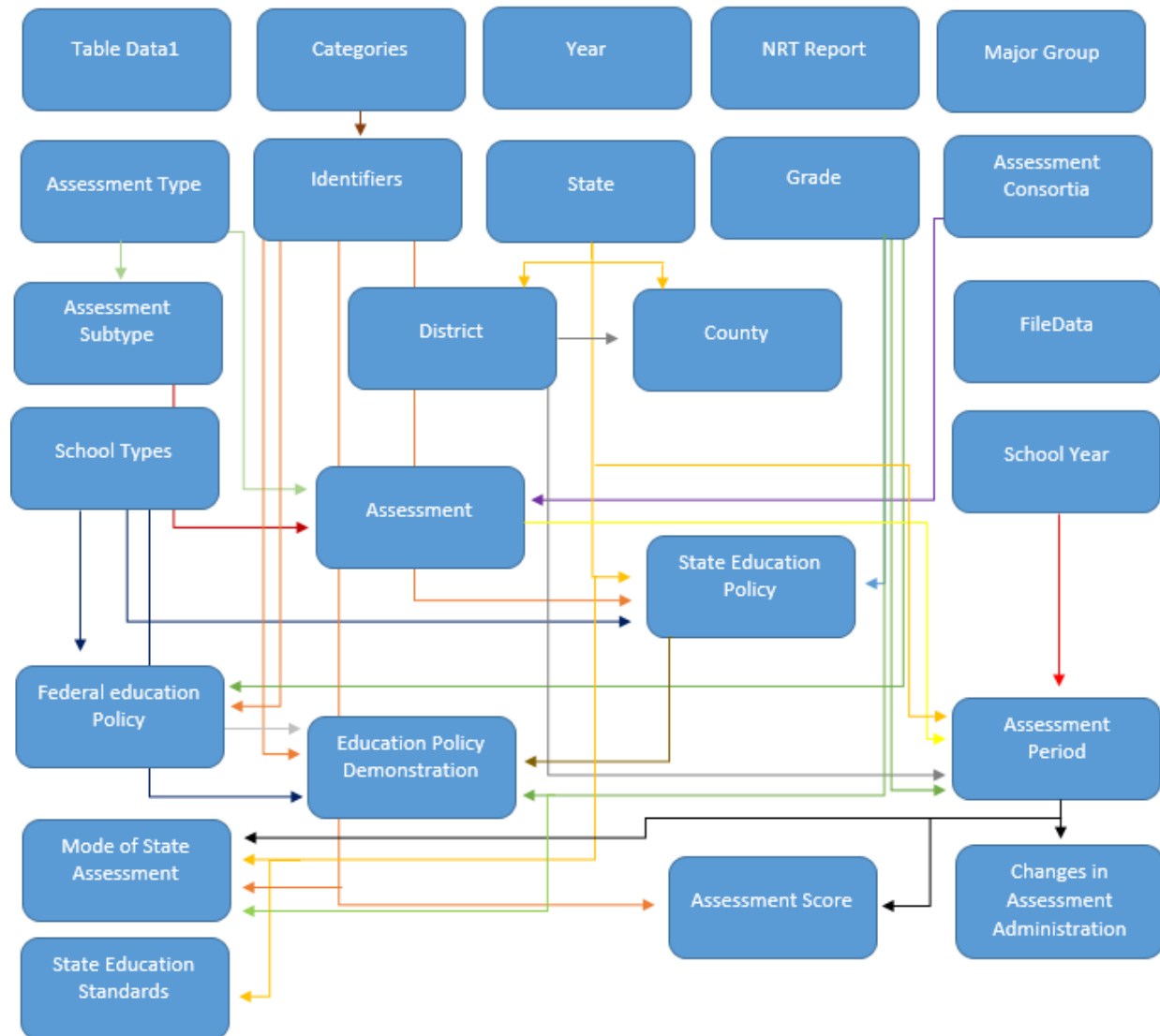


Figure 12: Relationship Between Entity Types in EdVRT

### 6.1.2 NAEP Results Data

The EdVRT system will access NAEP results data through the Nation’s Report card Data Service API. The system will query, return, process, and store the full range of data request types available through the API which include:

- Basic data request for a single variable or a cross tabulation of up to three variables;
- Data requests on significance gap across years;
- Data requests on significance gap across jurisdictions;
- Data requests on significance gap across a single variable;
- Data requests on significance gap across a multiple variable cross table;
- Data requests on significance gap between year and jurisdiction;

- Data requests on significance gap of two variable category values across years;
- Data requests on significance gap of two variable category values;
- across jurisdictions; and
- Data requests on significance gap of two variable category values and two years across jurisdictions.

Complete documentation on Nation's Report Card Data Service API is available at the URL:  
[https://www.nationsreportcard.gov/subject/commonobjects/pdf/api\\_documentation.pdf](https://www.nationsreportcard.gov/subject/commonobjects/pdf/api_documentation.pdf)

## 6.2 Data Dictionary

The EdVRT data dictionary defines the composition of data structures and the meaning of each field, including field name; definition; values; data entry notes; source of the data; and other information collected, stored and managed through each entity type. Please see Appendix D for the data dictionary.

The data dictionary defining parameter values for each data element including returns for the full range of data query requests for data accessed through the Nation's Report Card Data Service API is available at the URL:

[https://www.nationsreportcard.gov/subject/commonobjects/pdf/api\\_documentation.pdf](https://www.nationsreportcard.gov/subject/commonobjects/pdf/api_documentation.pdf)

## 6.3 User Groups

Within the EdVRT, the User Groups are based on User Classes defined in Section 2.2 The below section lists user groups based on the User Classes and provides specifics, where appropriate.

### **Super Administrators at Optimal**

This is a general user group and each super administrator has the same setting.

### **Administrators at NCES and Optimal**

This is a general user group and each administrator has the same setting.

### **Contributor/Edit/View users**

This is a general user group and each contributor/edit/view user has the same setting.

### **Contributor/View users**

This is a general user group and each contributor/view user has the same setting.

### **View users**

This is a general user group and each view user has the same setting.

## 7. External Interface Requirements

As a standalone system, there are no external interface requirements.

### 7.1 Software Interfaces

The EdVRT will connect with Ed's Tableau Dashboard server to create dashboards for SAEP which will then be integrated into EdVRT's pages. Optimal assumes they will be provided with Tableau Server credentials and would be able to connect to Tableau Server from existing server environments

## 8. Quality Attributes

### 8.1 Usability

At this time, no additional usability requirements have been identified by AD for EdVRT.

### 8.2 Performance

It is expected that performance requirements will need to be verified to ensure that a maximum number of 60 users (at peak time) do not experience a degradation of service.

### 8.3 Security

Security requirements will be driven primarily by the Privacy Impact Assessment, which is in-progress.

It is expected that no Personally Identifiable Information (PII) will be included in the EdVRT and the system will be rated FISMA low. As such, the appropriate security controls for a FISMA low system will be in place.

## 9. Internationalization and Localization Requirements

Not applicable.

## 10. Other Requirements

No "other requirements" are known at this time; however additional EdVRT requirements may want to be considered given the ability of Revelo core features particularly related to entity types and surveys. See Section 4.0 Product Features and 6.0 Data Requirements.

# Appendix A: Glossary

## Revelo™

Revelo is a web-based data collection, analysis, and reporting tool that harmonizes and integrates information across disparate data sources. The guiding principles for Revelo include a dedication to open data, auditability, verifiability, and accessibility.

In essence Revelo is never complete since it is essentially a flexible platform for coding entities (or data) that address individual data processing needs. The user is able to define entity types, questions, conceptual buckets, and modes of analysis. Revelo is developed and supported by Optimal Solutions Group, LLC (Optimal).

## Entity type

The Entity Type is the fundamental building block for Revelo that describes the format of the data which it contains. Types of entities may include files, datasets, contact information, employee information, etc. An entity type is a template for all instances or data records that it will hold. If you are collecting data and you are able to group certain data fields based on the common features or attributes, you can call this group an Entity Type. Users can have 1 to n entity types in their Revelo instance.

In Revelo, users can design different types of entities depending on their needs or the purpose of the data. For example, if you are collecting data about the weather for Asia, Europe, North America, South America, Africa, Australia or Antarctica you may create “Precipitation” and “Continent” as two separate Entity Types for such data.

## Entity

Merriam-Webster defines an entity as “something that exists by itself: something that is separate from other things” so by definition, an Entity is something distinct that can exist independently.

In the context of Revelo, an entity is a unique instance of a specified Entity Type. For example, if “Continent” is an Entity Type, then “Asia” is an Entity.

## Question / Attribute / Column

Entity types are represented and described by means of their properties, called Attributes. An attribute is a quality or feature regarded as a characteristic or inherent part of an Entity.

For example, if “Continent” is an Entity Type then for any Continent Entity its attributes may be “Population”, “Area” etc.

In Revelo, we are capturing data for these attributes using different type of questions. In addition, Revelo allows users to design and build reports utilizing these attributes where an individual attribute is associated with an individual column of the report.

## Question List / Check list

Question list is the group of questions or fields under a specific Entity type for capturing the data/actual instances.

For example, when entering data in Revelo for the “Continent” Entity Type questions like “Name of the Continent”, “Population of Continent” and “Area of Continent” are displayed for users to enter data.

### **Entity Type Interactive Question (ETIQ) Script**

The Entity Type Interactive Questionnaire (ETIQ) script is a specialized file structure (with a specified format) that Revelo administrators use to define attributes and upload questions for a specific Entity Type. The ETIQ script is a configuration for an Entity Type.

Technically, the ETIQ Script uses the JavaScript Object Notation (JSON) format. JSON is an open, text-based data exchange format that is in human readable format. This script also specifies other entity type design features including:

Question features (Text of question, mandatory or not, kind of question etc.).

Answer options (choices) for the questions (single or multi-select).

Unique keys for the questions.

Links between different Entity Types.

More details on the EITQ script are available in the Revelo User Manual.

## Appendix B: EdVRT Data Dictionary

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Table Data1	DataTable14	Subject	Subject	ChooseMulti	14
Table Data1	DataTable15	Grade	Grade	ChooseMulti	15
Table Data1	DataTable16	National	National	ChooseMulti	16
Table Data1	DataTable17	State	State	ChooseMulti	17
Table Data1	DataTable18	District	District	ChooseMulti	18
Table Data1	DataTable19	Major Groups	Major Groups	ChooseMulti	19
Table Data1	DataTable20	Student Factors	Student Factors	ChooseMulti	20
Table Data1	DataTable21	School Factors	School Factors	ChooseMulti	21
Table Data1	DataTable22	Teacher Factors	Teacher Factors	ChooseMulti	22
Table Data1	DataTable23	Statistics	Statistics	ChooseMulti	23
Table Data1	DataTable24	Graph Type	Graph Type	ChooseMulti	24
Table Data1	Q1	Name	Name	Text	1
Table Data1	Q2	AssessmentYear	AssessmentYear	Text	2
Table Data1	Q3	File	File	File	13
Category	Q1	Category Name	Category Name	Text	1
Identifier	Q1	Select Category	Select Category	ChooseOne	1
Identifier	Q2	Identifier Name	Identifier Name	Text	2
Identifier	Q3	Identifier ID	Identifier ID	Text	3
Mode of State Assessment	ModeOfStateAssessment1	State Name	State Name	ChooseOne	1
Mode of State Assessment	ModeOfStateAssessment2	Assessment Period	Assessment Period	ChooseOne	2
Mode of State Assessment	ModeOfStateAssessment3	Assessment Name	Assessment Name	ChooseOne	3
Mode of State Assessment	ModeOfStateAssessment4	Grade	Grade	ChooseMulti	4
Mode of State Assessment	ModeOfStateAssessment5	Assessment Mode	Assessment Mode	ChooseOne	5
State Education Standards	StateEdStandard1	State Name	State Name	ChooseOne	1
State Education Standards	StateEdStandard2	State Education Standard Affiliation	State Education Standard Affiliation	ChooseOne	2
State Education Standards	StateEdStandard3	Year of Adoption of Education Standard	Year of Adoption of Education Standard	LongDate	3
State Education Standards	StateEdStandard4	Year of Drop Out of Education Standard	Year of Drop Out of Education Standard	LongDate	4

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Year	Year100	Year(YYYY)	Year(YYYY)	Text	100
School Year	SchoolYear100	School Year(YYYY-YYYY)	School Year(YYYY-YYYY)	Text	100
Grade	Grade100	Grade	Grade	Text	100
State	State100	State:	State:	Text	100
State	State200	State Abbreviation:	State Abbreviation:	Text	200
State	State300	State FIPS code:	State FIPS code:	Text	300
County	County100	State:	State:	ChooseOne	100
County	County200	County:	County:	Text	200
County	County300	County FIPS code:	County FIPS code:	Text	300
Assessment Type	AssessmentType100	Assessment Type	Assessment Type	Text	100
Assessment Subtype	AssessmentSubtype100	Assessment Type:	Assessment Type:	ChooseOne	100
Assessment Subtype	AssessmentSubtype200	Assessment Subtype:	Assessment Subtype:	Text	200
Assessment Subtype	AssessmentSubtype300	Website URL where information was obtained	Website URL where information was obtained	Text	300
Assessment Subtype	AssessmentSubtype400	Notes	Notes	Text	400
District	District100	State:	State:	ChooseOne	100
District	District200	County:	County:	ChooseOne	200
District	District300	CCD District:	CCD District:	Text	300
District	District400	NAEP TUDA:	NAEP TUDA:	Text	400
NRT Report	NRT_Tool_3	Publication Date	Publication Date	ShortDate	3
NRT Report	NRT_Tool_1	Publication Title	Publication Title	Text	1
NRT Report	NRT_Tool_2	Publication Number	Publication Number	Text	2
NRT Report	NRT_Tool_4	Publication Highlight	Publication Highlight	Text	4
NRT Report	NRT_Tool_5	Finding 1 Synthesis	Finding 1 Synthesis	Text	5
NRT Report	NRT_Tool_6	Finding 1 Supporting Evidence	Finding 1 Supporting Evidence	Text	6
NRT Report	NRT_Tool_8	Finding 1 Figure Note	Finding 1 Figure Note	Text	8
NRT Report	NRT_Tool_9	Finding 1 Figure Source	Finding 1 Figure Source	Text	9
NRT Report	NRT_Tool_10	Finding 2 Synthesis	Finding 2 Synthesis	Text	10
NRT Report	NRT_Tool_11	Finding 2 Supporting Evidence	Finding 2 Supporting Evidence	Text	11
NRT Report	NRT_Tool_13	Finding 2 Figure Note	Finding 2 Figure Note	Text	13
NRT Report	NRT_Tool_14	Finding 2 Figure Source	Finding 2 Figure Source	Text	14
NRT Report	NRT_Tool_15	Publication Endnotes	Publication Endnotes	Text	15
NRT Report	NRT_Tool_7	Finding 1 Figure	Finding 1 Figure	File	7

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
NRT Report	NRT_Tool_12	Finding 2 Figure	Finding 2 Figure	File	12
Assessment	Assessment9	Consortia Affiliation	Consortia Affiliation	ChooseOne	9
Assessment	Assessment3	Assessment Type	Assessment Type	ChooseMulti	3
Assessment	Assessment4	Assessment Subtype	Assessment Subtype	ChooseMulti	4
Assessment	Assessment7	Assessment Designated Grade	Assessment Designated Grade	ChooseMulti	7
Assessment	Assessment5	Aligned Federal Policy	Aligned Federal Policy	ChooseMulti	5
Assessment	Assessment6	Aligned State Policy	Aligned State Policy	ChooseMulti	6
Assessment	Assessment1	Assessment Name	Assessment Name	Text	1
Assessment	Assessment2	Assessment Description	Assessment Description	Text	2
Assessment	Assessment8	Assessment Designated Inclusion/Exclusion	Assessment Designated Inclusion/Exclusion	Text	8
Assessment	Assessment10	Assessment Author(s)	Assessment Author(s)	Text	10
Assessment Consortia	AssessmentConsortia6	Is the Start Date of the Consortia Known?	Is the Start Date of the Consortia Known?	ChooseOne	6
Assessment Consortia	AssessmentConsortia7	Consortia's Start Date	Consortia's Start Date	LongDate	7
Assessment Consortia	AssessmentConsortia8	Consortia's Termination Date	Consortia's Termination Date	LongDate	8
Assessment Consortia	9	Consortia's Start Date	Consortia's Start Date	ShortDate	9
Assessment Consortia	10	Consortia's Termination Date	Consortia's Termination Date	ShortDate	10
Assessment Consortia	AssessmentConsortia1	Assessment Consortia's Name	Assessment Consortia's Name	Text	1
Assessment Consortia	AssessmentConsortia2	Description of Consortia	Description of Consortia	Text	2
Assessment Consortia	AssessmentConsortia3	Consortia's Websites URL	Consortia's Websites URL	Text	3
Assessment Consortia	AssessmentConsortia4	Consortia's Strategic Goal	Consortia's Strategic Goal	Text	4
Assessment Consortia	AssessmentConsortia5	Consortia Inclusion and Exclusion Criteria	Consortia Inclusion and Exclusion Criteria	Text	5
School Type	SchoolType1	School Type	School Type	Text	1
School Type	SchoolType2	School Type Description	School Type Description	Text	2
Major Groups	MajorGroups1	Major Groups	Major Groups	Text	1
Assessment Period	AssessmentPeriod1	Assessment Name	Assessment Name	ChooseOne	1
Assessment Period	AssessmentPeriod2	Jurisdiction Type	Jurisdiction Type	ChooseOne	2
Assessment Period	AssessmentPeriod3	State	State	ChooseOne	3

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Assessment Period	AssessmentPeriod4	Jurisdiction	Jurisdiction	ChooseOne	4
Assessment Period	AssessmentPeriod5	School Years Assessment Administered	School Years Assessment Administered	ChooseOne	5
Assessment Period	AssessmentPeriod6	Components Not Administered	Components Not Administered	ChooseOne	6
Assessment Period	AssessmentPeriod8	Were any sub-components of the assessment not administered	Were any sub-components of the assessment not administered	ChooseOne	8
Assessment Period	AssessmentPeriod10	Assessment Grade	Assessment Grade	ChooseOne	10
Assessment Period	AssessmentPeriod13	Assessment Performance-base	Assessment Performance-base	ChooseOne	13
Assessment Period	AssessmentPeriod14	Assessment Includes Constructed Responses	Assessment Includes Constructed Responses	ChooseOne	14
Assessment Period	AssessmentPeriod9	Which sub-components of the assessment were not administered?	Which sub-components of the assessment were not administered?	ChooseMulti	9
Assessment Period	AssessmentPeriod11	Assessment Student Exclusion Groups	Assessment Student Exclusion Groups	ChooseMulti	11
Assessment Period	AssessmentPeriod15	Assessment Administration Types	Assessment Administration Types	ChooseMulti	15
Assessment Period	AssessmentPeriod116	Assessment Administration Electronic Media	Assessment Administration Electronic Media	ChooseMulti	16
Assessment Period	AssessmentPeriod22	Assessment Scoring Metrics Reported	Assessment Scoring Metrics Reported	ChooseMulti	22
Assessment Period	AssessmentPeriod23	Assessment Scoring Metrics Reported (Numeric)	Assessment Scoring Metrics Reported (Numeric)	ChooseMulti	23
Assessment Period	AssessmentPeriod24	Assessment Scoring Metrics Reported (Percentage)	Assessment Scoring Metrics Reported (Percentage)	ChooseMulti	24
Assessment Period	AssessmentPeriod25	Assessment Scoring Metrics Reported (Likert)	Assessment Scoring Metrics Reported (Likert)	ChooseMulti	25
Assessment Period	AssessmentPeriod26	Assessment Scoring Demographic Reporting	Assessment Scoring Demographic Reporting	ChooseMulti	26
Assessment Period	AssessmentPeriod19	Date Findings Were Released to the public	Date Findings Were Released to the public	LongDate	19
Assessment Period	AssessmentPeriod12	Assessment Inclusion/Exclusion	Assessment Inclusion/Exclusion	Text	12
Assessment Period	AssessmentPeriod17	Resource URL	Resource URL	Text	17

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Assessment Period	AssessmentPeriod20	Source of assessment findings (website URL)	Source of assessment findings (website URL)	Text	20
Assessment Period	AssessmentPeriod27	Notes	Notes	Text	27
Assessment Period	AssessmentPeriod18	Resource	Resource	File	18
Assessment Period	AssessmentPeriod21	Source of assessment findings (upload documents)	Source of assessment findings (upload documents)	File	21
Changes in Assessment Administered	ChangesInAssesmentAdministered1	Select Previous Assessment Year	Select Previous Assessment Year	ChooseOne	1
Changes in Assessment Administered	ChangesInAssesmentAdministered2	Revised Assessment Year	Revised Assessment Year	ChooseOne	2
Changes in Assessment Administered	ChangesInAssesmentAdministered3	Were Items Removed?	Were Items Removed?	ChooseOne	3
Changes in Assessment Administered	ChangesInAssesmentAdministered5	Were Items Added	Were Items Added	ChooseOne	5
Changes in Assessment Administered	ChangesInAssesmentAdministered7	Expanded Constructed Response Items	Expanded Constructed Response Items	ChooseOne	7
Changes in Assessment Administered	ChangesInAssesmentAdministered8	Changed Standard for Proficiency	Changed Standard for Proficiency	ChooseOne	8
Changes in Assessment Administered	ChangesInAssesmentAdministered9	How Did the Proficiency Standard Change	How Did the Proficiency Standard Change	ChooseOne	9
Changes in Assessment Administered	ChangesInAssesmentAdministered4	Which Sub Components of the Assessment Were Added	Which Sub Components of the Assessment Were Added	ChooseMulti	4
Changes in Assessment Administered	ChangesInAssesmentAdministered6	Which Sub-components of the Assesment Were added	Which Sub-components of the Assesment Were added	ChooseMulti	6
Changes in Assessment Administered	ChangesInAssesmentAdministered10	Describe the change in proficiency standard	Describe the change in proficiency standard	Text	10
Changes in Assessment Administered	ChangesInAssesmentAdministered11	Source	Source	Text	11
State Education Policy	StateEducationPolicy1	Is this policy or legislation tied to an overarching federal policy or legislation	Is this policy or legislation tied to an overarching federal policy or legislation	ChooseOne	1

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
State Education Policy	StateEducationPolicy2	Select the overarching federal policy or legislation	Select the overarching federal policy or legislation	ChooseOne	2
State Education Policy	StateEducationPolicy3	Select State enacting the Education policy or legislation	Select State enacting the Education policy or legislation	ChooseOne	3
State Education Policy	StateEducationPolicy8	Affected School Types	Affected School Types	ChooseMulti	8
State Education Policy	StateEducationPolicy9	Affected Subject Matter	Affected Subject Matter	ChooseMulti	9
State Education Policy	StateEducationPolicy10	Affected Grades	Affected Grades	ChooseMulti	10
State Education Policy	StateEducationPolicy11	State's Education Policy Initiation Date	State's Education Policy Initiation Date	ShortDate	11
State Education Policy	StateEducationPolicy12	State's Education Policy Termination Date	State's Education Policy Termination Date	ShortDate	12
State Education Policy	StateEducationPolicy4	Enter the name of the state's Education policy or legislation	Enter the name of the state's Education policy or legislation	Text	4
State Education Policy	StateEducationPolicy5	State's Education Policy Name	State's Education Policy Name	Text	5
State Education Policy	StateEducationPolicy6	Detailed Description of State's Education Policy	Detailed Description of State's Education Policy	Text	6
State Education Policy	StateEducationPolicy7	State's Education Policy Authorizing Legislation (Enter 'None' if this is not applicable)	State's Education Policy Authorizing Legislation (Enter 'None' if this is not applicable)	Text	7
State Education Policy	StateEducationPolicy15	Source	Source	Text	15
Federal Education Policy	FedEducationPolicy5	Affected School Types	Affected School Types	ChooseMulti	5
Federal Education Policy	FedEducationPolicy6	Affected Subject Matter	Affected Subject Matter	ChooseMulti	6
Federal Education Policy	FedEducationPolicy7	Affected Grades	Affected Grades	ChooseMulti	7
Federal Education Policy	FedEducationPolicy8	Education Policy Initiation Date	Education Policy Initiation Date	ShortDate	8

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Federal Education Policy	FedEducationPolicy9	Education Policy Termination Date	Education Policy Termination Date	ShortDate	9
Federal Education Policy	FedEducationPolicy1	Education Policy Name	Education Policy Name	Text	1
Federal Education Policy	FedEducationPolicy3	Education Policy Detailed Description	Education Policy Detailed Description	Text	3
Federal Education Policy	FedEducationPolicy12	Source	Source	Text	12
Education Policy Demonstration	EduPolDemo1	Education Initiative Type	Education Initiative Type	ChooseOne	1
Education Policy Demonstration	EduPolDemo2	Is the Overarching Education Policy Federal Or State	Is the Overarching Education Policy Federal Or State	ChooseOne	2
Education Policy Demonstration	EduPolDemo3	Select The State Overarching Education Policy	Select The State Overarching Education Policy	ChooseOne	3
Education Policy Demonstration	EduPolDemo4	Select The Federal Overarching Education Policy	Select The Federal Overarching Education Policy	ChooseOne	4
Education Policy Demonstration	EduPolDemo14	Education Policy approval status	Education Policy approval status	ChooseOne	14
Education Policy Demonstration	EduPolDemo16	Education Policy implementation status	Education Policy implementation status	ChooseOne	16
Education Policy Demonstration	EduPolDemo18	Education Policy implementation status	Education Policy implementation status	ChooseOne	18
Education Policy Demonstration	EduPolDemo11	Affected School Type	Affected School Type	ChooseMulti	11
Education Policy Demonstration	EduPolDemo12	Affected Subject Matter	Affected Subject Matter	ChooseMulti	12
Education Policy Demonstration	EduPolDemo13	Affected Grades	Affected Grades	ChooseMulti	13
Education Policy Demonstration	EduPolDemo19	Education Policy Initiation Date	Education Policy Initiation Date	LongDate	19
Education Policy Demonstration	EduPolDemo20	Education Policy Termination Date	Education Policy Termination Date	LongDate	20
Education Policy Demonstration	EduPolDemo7	Education Initiative Title	Education Initiative Title	Text	7

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Education Policy Demonstration	EduPolDemo8	Education Initiative Description	Education Initiative Description	Text	8
Education Policy Demonstration	EduPolDemo15	Education Policy Approval status description	Education Policy Approval status description	Text	15
Education Policy Demonstration	EduPolDemo17	Education Policy implementation status description	Education Policy implementation status description	Text	17
Education Policy Demonstration	EduPolDemo21	Notes	Notes	Text	21
Education Policy Demonstration	EduPolDemo22	Source/URL	Source/URL	Text	22
Assessment Score	AssessmentScore1	Assessment Period	Assessment Period	ChooseOne	1
Assessment Score	AssessmentScore2	What Assessment Type was Administered for this period?	What Assessment Type was Administered for this period?	ChooseOne	2
Assessment Score	AssessmentScore3	Writing Results as a subscale of ELA Assessment	Writing Results as a subscale of ELA Assessment	ChooseOne	3
Assessment Score	AssessmentScore4	Participation Rate	Participation Rate	Text	4
Assessment Score	AssessmentScore5	Proficiency Rate	Proficiency Rate	Text	5
Assessment Score	AssessmentScore6	Advanced/Proficient	Advanced/Proficient	Text	6
Assessment Score	AssessmentScore7	Below/Far Below Proficient	Below/Far Below Proficient	Text	7
Assessment Score	AssessmentScore8	Exceeds	Exceeds	Text	8
Assessment Score	AssessmentScore9	Meets	Meets	Text	9
Assessment Score	AssessmentScore10	Approaches	Approaches	Text	10
Assessment Score	AssessmentScore11	Falls Far Below	Falls Far Below	Text	11
Assessment Score	AssessmentScore12	Percent Passing (Percent Exceeds + Percent Meets)	Percent Passing (Percent Exceeds + Percent Meets)	Text	12
Assessment Score	AssessmentScore13	Exceeding	Exceeding	Text	13
Assessment Score	AssessmentScore14	Ready	Ready	Text	14
Assessment Score	AssessmentScore15	Close	Close	Text	15
Assessment Score	AssessmentScore16	In Need of Support	In Need of Support	Text	16

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Assessment Score	AssessmentScore17	Met Readiness Benchmark	Met Readiness Benchmark	Text	17
Assessment Score	AssessmentScore18	Above Standard	Above Standard	Text	18
Assessment Score	AssessmentScore19	At or Near Standard	At or Near Standard	Text	19
Assessment Score	AssessmentScore20	Near Standard	Near Standard	Text	20
Assessment Score	AssessmentScore21	Below Standard	Below Standard	Text	21
Assessment Score	AssessmentScore22	Advanced	Advanced	Text	22
Assessment Score	AssessmentScore23	Proficient	Proficient	Text	23
Assessment Score	AssessmentScore24	Partially Proficient	Partially Proficient	Text	24
Assessment Score	AssessmentScore25	Unsatisfactory	Unsatisfactory	Text	25
Assessment Score	AssessmentScore26	Proficient/Advanced	Proficient/Advanced	Text	26
Assessment Score	AssessmentScore27	At Goal	At Goal	Text	27
Assessment Score	AssessmentScore28	Basic	Basic	Text	28
Assessment Score	AssessmentScore29	Below Basic	Below Basic	Text	29
Assessment Score	AssessmentScore30	At/Above Proficiency	At/Above Proficiency	Text	30
Assessment Score	AssessmentScore31	At/Above Goal	At/Above Goal	Text	31
Assessment Score	AssessmentScore32	Earning 6 Points	Earning 6 Points	Text	32
Assessment Score	AssessmentScore33	Earning 5.5 Points	Earning 5.5 Points	Text	33
Assessment Score	AssessmentScore35	Earning 5 Points	Earning 5 Points	Text	35
Assessment Score	AssessmentScore36	Earning 4.5 Points	Earning 4.5 Points	Text	36
Assessment Score	AssessmentScore37	Earning 4 Points	Earning 4 Points	Text	37
Assessment Score	AssessmentScore38	Earning 3.5 Points	Earning 3.5 Points	Text	38
Assessment Score	AssessmentScore39	Earning 3 Points	Earning 3 Points	Text	39
Assessment Score	AssessmentScore40	Earning 2.5 Points	Earning 2.5 Points	Text	40
Assessment Score	AssessmentScore41	Earning 2 Points	Earning 2 Points	Text	41
Assessment Score	AssessmentScore42	Earning 1.5 Points	Earning 1.5 Points	Text	42

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Assessment Score	AssessmentScore43	Earning 1 Point	Earning 1 Point	Text	43
Assessment Score	AssessmentScore44	Earning 4 Points and Above	Earning 4 Points and Above	Text	44
Assessment Score	AssessmentScore45	Does Not Meet	Does Not Meet	Text	45
Assessment Score	AssessmentScore46	Not Proficient	Not Proficient	Text	46
Assessment Score	AssessmentScore47	Distinguished	Distinguished	Text	47
Assessment Score	AssessmentScore49	Apprentice	Apprentice	Text	49
Assessment Score	AssessmentScore50	Novice	Novice	Text	50
Assessment Score	AssessmentScore51	Proficient and Distinguished	Proficient and Distinguished	Text	51
Assessment Score	AssessmentScore52	Score 4	Score 4	Text	52
Assessment Score	AssessmentScore53	Score 3	Score 3	Text	53
Assessment Score	AssessmentScore54	Score 2	Score 2	Text	54
Assessment Score	AssessmentScore55	Score 1	Score 1	Text	55
Assessment Score	AssessmentScore56	Score 0	Score 0	Text	56
Assessment Score	AssessmentScore57	Score 3 and Above	Score 3 and Above	Text	57
Assessment Score	AssessmentScore58	Exceed the Standards	Exceed the Standards	Text	58
Assessment Score	AssessmentScore59	Meet the Standards	Meet the Standards	Text	59
Assessment Score	AssessmentScore60	Below the Standards	Below the Standards	Text	60
Assessment Score	AssessmentScore61	Exceeds Standard	Exceeds Standard	Text	61
Assessment Score	AssessmentScore62	Meets Standard	Meets Standard	Text	62
Assessment Score	AssessmentScore63	Approached Standard	Approached Standard	Text	63
Assessment Score	AssessmentScore64	Emergent/Developing	Emergent/Developing	Text	64
Assessment Score	AssessmentScore65	Average Percent Correct	Average Percent Correct	Text	65
Assessment Score	AssessmentScore66	Above Standard	Above Standard	Text	66
Assessment Score	AssessmentScore67	Above Proficient	Above Proficient	Text	67
Assessment Score	AssessmentScore68	At/Near Proficient	At/Near Proficient	Text	68

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Assessment Score	AssessmentScore69	Below Proficient	Below Proficient	Text	69
Assessment Score	AssessmentScore70	Level 4 (Proficient with Distinction)	Level 4 (Proficient with Distinction)	Text	70
Assessment Score	AssessmentScore71	Level 3 (Proficient)	Level 3 (Proficient)	Text	71
Assessment Score	AssessmentScore72	Level 2 (Partially Proficient)	Level 2 (Partially Proficient)	Text	72
Assessment Score	AssessmentScore73	Level 1 (Substantially Below Proficient)	Level 1 (Substantially Below Proficient)	Text	73
Assessment Score	AssessmentScore74	Limited Knowledge	Limited Knowledge	Text	74
Assessment Score	AssessmentScore75	Unsatisfactory	Unsatisfactory	Text	75
Assessment Score	AssessmentScore76	At/Near Standard	At/Near Standard	Text	76
Assessment Score	AssessmentScore77	Below Standard	Below Standard	Text	77
Assessment Score	AssessmentScore78	Meeting or Exceeding Standard	Meeting or Exceeding Standard	Text	78
Assessment Score	AssessmentScore79	Proficient with Distinction	Proficient with Distinction	Text	79
Assessment Score	AssessmentScore80	Substantially Below Proficient	Substantially Below Proficient	Text	80
Assessment Score	AssessmentScore81	Total Proficient and Above	Total Proficient and Above	Text	81
Assessment Score	AssessmentScore82	Students Scoring 'Exemplary'	Students Scoring 'Exemplary'	Text	82
Assessment Score	AssessmentScore83	Students Scoring 'Met'	Students Scoring 'Met'	Text	83
Assessment Score	AssessmentScore84	Students Scoring 'Not Met'	Students Scoring 'Not Met'	Text	84
Assessment Score	AssessmentScore85	Students Scoring 'Met' and 'Exemplary'	Students Scoring 'Met' and 'Exemplary'	Text	85
Assessment Score	AssessmentScore86	Students Scoring 'Exceeding'	Students Scoring 'Exceeding'	Text	86
Assessment Score	AssessmentScore87	Students Scoring 'Ready'	Students Scoring 'Ready'	Text	87
Assessment Score	AssessmentScore88	Students Scoring 'Close'	Students Scoring 'Close'	Text	88
Assessment Score	AssessmentScore89	Students Scoring 'In Need of Support'	Students Scoring 'In Need of Support'	Text	89
Assessment Score	AssessmentScore90	Students Scoring 'Ready' or 'Exceeding'	Students Scoring 'Ready' or 'Exceeding'	Text	90
Assessment Score	AssessmentScore91	Students with High Performance	Students with High Performance	Text	91
Assessment Score	AssessmentScore92	Students with Middle Performance	Students with Middle Performance	Text	92
Assessment Score	AssessmentScore93	Students with Low Performance	Students with Low Performance	Text	93

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Assessment Score	AssessmentScore94	Development	Development	Text	94
Assessment Score	AssessmentScore95	Focus/Organization	Focus/Organization	Text	95
Assessment Score	AssessmentScore96	Language	Language	Text	96
Assessment Score	AssessmentScore97	Conventions	Conventions	Text	97
Assessment Score	AssessmentScore98	Commended Performance	Commended Performance	Text	98
Assessment Score	AssessmentScore99	Met Standard	Met Standard	Text	99
Assessment Score	AssessmentScore100	Above	Above	Text	100
Assessment Score	AssessmentScore101	At/Near	At/Near	Text	101
Assessment Score	AssessmentScore102	Below	Below	Text	102
Assessment Score	AssessmentScore103	8.5 to 9 Points	8.5 to 9 Points	Text	103
Assessment Score	AssessmentScore104	7.5 to 8 Points	7.5 to 8 Points	Text	104
Assessment Score	AssessmentScore105	6.5 to 7 Points	6.5 to 7 Points	Text	105
Assessment Score	AssessmentScore106	5.5 to 6 Points	5.5 to 6 Points	Text	106
Assessment Score	AssessmentScore107	4.5 to 5 Points	4.5 to 5 Points	Text	107
Assessment Score	AssessmentScore108	3.5 to 4 Points	3.5 to 4 Points	Text	108
Assessment Score	AssessmentScore109	2.5 to 3 Points	2.5 to 3 Points	Text	109
Assessment Score	AssessmentScore110	0 to 2 Points	0 to 2 Points	Text	110
Assessment Score	AssessmentScore111	Proficient and Advanced	Proficient and Advanced	Text	111
Assessment Score	AssessmentScore112	Level III: Advanced (Part of Satisfactory)	Level III: Advanced (Part of Satisfactory)	Text	112
Assessment Score	AssessmentScore113	Level II: Satisfactory	Level II: Satisfactory	Text	113
Assessment Score	AssessmentScore114	Level I: Unsatisfactory	Level I: Unsatisfactory	Text	114
Assessment Score	AssessmentScore115	Masters (Part of Approaches)	Masters (Part of Approaches)	Text	115
Assessment Score	AssessmentScore116	Meets (Part of Approaches)	Meets (Part of Approaches)	Text	116
Assessment Score	AssessmentScore117	Did Not Meet	Did Not Meet	Text	117
Assessment Score	AssessmentScore118	Advanced Rate (Part of the Pass Rate)	Advanced Rate (Part of the Pass Rate)	Text	118

Entity Type	Question Id	Text	Abbreviation	Question Type	Question Order
Assessment Score	AssessmentScore119	Proficient Rate (Part of the Pass Rate)	Proficient Rate (Part of the Pass Rate)	Text	119
Assessment Score	AssessmentScore120	Pass Rate	Pass Rate	Text	120
Assessment Score	AssessmentScore121	Fail Rate	Fail Rate	Text	121
Assessment Score	AssessmentScore122	Level 4 (Exceeds Standard)	Level 4 (Exceeds Standard)	Text	122
Assessment Score	AssessmentScore123	Level 3 (Met Standard)	Level 3 (Met Standard)	Text	123
Assessment Score	AssessmentScore124	Basic (Met Standard)	Basic (Met Standard)	Text	124
Assessment Score	AssessmentScore125	Level 2 (Below Standard)	Level 2 (Below Standard)	Text	125
Assessment Score	AssessmentScore126	Level 1 (Well Below Standard)	Level 1 (Well Below Standard)	Text	126
Assessment Score	AssessmentScore127	Level 1 (Emerging Learner)	Level 1 (Emerging Learner)	Text	127
Assessment Score	AssessmentScore128	Level 2 (Developing Learner)	Level 2 (Developing Learner)	Text	128
Assessment Score	AssessmentScore129	Level 3 (Proficient Learner)	Level 3 (Proficient Learner)	Text	129
Assessment Score	AssessmentScore130	Level 4 (Distinguished Learner)	Level 4 (Distinguished Learner)	Text	130
Assessment Score	AssessmentScore131	Exceeding Expectations	Exceeding Expectations	Text	131
Assessment Score	AssessmentScore132	Meeting Expectations	Meeting Expectations	Text	132
Assessment Score	AssessmentScore133	Partially Meeting Expectations	Partially Meeting Expectations	Text	133
Assessment Score	AssessmentScore134	Not Meeting Expectations	Not Meeting Expectations	Text	134
FileData	Name	Name	Name	Text	10
FileData	File	File	File	File	20