Test Delivery System	
Common Online Testing Requirements	**Pearson Solution**
Security	
Test content must be secure from interception during transfer and storage.	All TestNav test data are encrypted on a Pearson server and remain encrypted in transit and on the caching server. The TestNav system decrypts the test items only in the temporary memory of the student's testing computer. Any <<STATE_NAME>> data intercepted would be completely indecipherable.
The interface must not enable students to cheat in any way. The test delivery system must prevent saving, sending, or receiving any data while testing.	The TestNav system puts the testing computer on "lockdown," also known as "kiosk mode." No functions other than testing are enabled. TestNav security is engineered to prevent access to the following: ▪ The desktop ▪ Cut, copy, and paste functions ▪ Any other applications ▪ Messaging and email ▪ Printers ▪ Screen capture
The delivery system must incorporate strong protocols for authenticating the user and protecting user and test data.	To verify that the right <<STATE_NAME>> student is taking the right test, TestNav security requires the correct student ID, combined with a unique test code. These login credentials are used to authenticate that the right student is taking the right test and will work only after the proctor approves the student and starts the test session. In addition to strong authentication protocols, the TestNav system maintains the examinee state external to the client. This means that the only data on the client machine at any one time are the current item. All other information about the student and the test is maintained on the server.
No data shall remain at the testing site after the student finishes the session.	Test items are decrypted only in the temporary memory of the testing computer and never written to the clipboard or hard drive. When the TestNav session terminates, the memory is flushed and no trace remains of the assessment or the student's answers.
Consistency	
To keep entry costs low, the delivery system must operate on older computers and operating systems while maintaining a comparable experience for all users.	The TestNav platform is designed to run on the computers, operating systems, and browsers already found in most <<STATE_NAME>> schools. This includes many systems that are near the end of their service life. With the browser-based TestNav platform, no additional hardware or software is typically needed. The user interface and test content are delivered through the same web browser that students use every day.
The system must function responsively while delivering all of the items specific to <<STATE_NAME>>.	The file size of a test item affects technology requirements. For example, items containing video can place greater demands on local infrastructure. We will work with <<DOE_NAME>> and <<STATE_NAME>> schools and districts to match the test to the overall computing environment.

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The user experience must be visually consistent across all approved computers and operating systems.	The TestNav platform presents a consistent user experience. Pearson has designed a web application using responsive design principles. This means the interface scales itself based on the size of the device's screen. Users will have the same online tools, and the presentation will have the same look and feel, adjusted to the device used to deliver the test.
Scalability	
Servers must be able to balance peak loads and deliver consistent response times.	Pearson emphasizes scalability in both the server and client environments. We will examine the following three areas to avoid assessment bottlenecks: ▪ Types of computer used for testing ▪ Bandwidth necessary for the specific test ▪ Server capacity and balance Pearson uses a variety of techniques for configuring and balancing servers for consistently quick response time. In addition to traditional load balancing and hardware deployment techniques, we use software technologies that provide clustering capabilities.
The vendor must constantly test and verify system capacity.	We will conduct regular performance testing to simulate how the entire <<STATE_NAME>> environment will actually behave on test day. Networks change and computer usage patterns change, so we observe and anticipate the needs of each test administration. Pearson has successfully delivered more than 429,000 tests in a single day.
The solution must address school bandwidth issues.	The TestNav system includes lightweight, secure local caching software. Proctor caching enables schools and districts to download test content only once and deliver it securely from local servers, instead of relying on potentially shaky or insufficient Internet connectivity for content delivery during testing. If a school or district has the necessary bandwidth or existing caching software, they can test without proctor caching. Our experience has shown, however, that this can be highly risky and is therefore heavily discouraged.
Reliability	
The delivery system must save student responses even in case of power or network failure.	The TestNav platform is designed to store all responses that students have made, even when a power or Internet disruption causes delay or failure. An early warning system will minimize the effect technical failures have on the student's <<STATE_NAME>> assessment experience.
The system must provide the location of saved responses.	If a student's workstation is unable to transmit responses to the testing server during a test, the early warning system saves the responses to an encrypted backup file in a configurable location. This activity occurs in the background while the TestNav system continues to provide test questions to the student, who may either continue testing or exit without losing data.

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Testing must resume with minimal disruption.	The TestNav platform and the early warning system are designed to enable a student to resume the test after an interruption at the same point in the test where the interruption occurred. When the network connection resumes, the TestNav system uploads the saved responses to the testing server and erases the encrypted response file automatically.
Cost of Ownership	
The client software shall require no downloading or installation.	The TestNav system requires only a standard computer, operating system, and browser to deliver functionality. Solutions that require special software downloads to be installed on each testing device place a heavy burden on local technology support staff, first to initially install and configure the system and then to retouch each machine when there are updates or patches. These steps are completely unnecessary with TestNav architecture.
Any software maintenance must be vendor's burden.	The TestNav system resides on Pearson servers, where we maintain it. The software will never reside on <<STATE_NAME>> computers.
The delivery system must minimize ongoing maintenance costs.	When we say "zero footprint," we mean "zero footprint": ▪ District technical staff spend zero time installing and deleting software. ▪ The TestNav system does not incur repeated labor costs because it does not use proprietary client software or special browser. ▪ Competitors' systems can require repeated installation and deletion, which continue to add cyclical costs (as shown in the following figure).