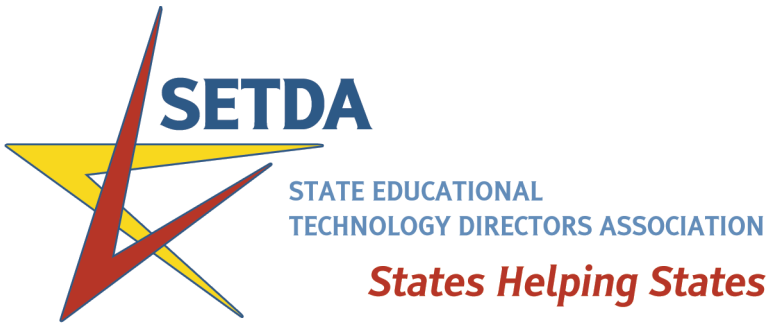

TECHNOLOGY REQUIREMENTS FOR LARGE-SCALE COMPUTER-BASED AND ONLINE ASSESSMENT: CURRENT STATUS AND ISSUES

DISCUSSION DRAFT: June 22, 2011

For review and comment

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Please visit www.assess4ed.net to offer comments, suggestions, and new information to improve this paper.

About SETDA

Founded in the fall of 2001, the State Educational Technology Directors Association (SETDA) is the principal association representing U.S. state and territorial directors for educational technology. SETDA works collectively and in partnership with other national organizations and serves as a forum for inter-state collaboration and cooperation on a range of issues, including the identification and sharing of research and best practices, the establishment of public-private partnerships, state-federal relations and advocacy, and professional development for state educational technology directors and staff. For more information go to www.setda.org

TECHNOLOGY SPECIFICATIONS FOR LARGE-SCALE COMPUTER-BASED AND ONLINE ASSESSMENT: CURRENT STATUS AND ISSUES

Background

In 2010, in an effort to better prepare all students to succeed in our increasingly competitive global economy and society, the Council of Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA Center) launched the state-led Common Core State Standards (CCSS) initiative. To date, 42 states, the District of Columbia, and the Virgin Islands have formally adopted the CCSS and are in various stages of implementing them in their state education systems.

Chief among the challenges facing states implementing the CCSS will be the tasks associated with developing and deploying new so-called "next generation" assessment systems, especially if the vision and intent for higher-order student learning behind the CCSS initiative is to be realized. We agree with those that contend that by administering new CCSS-aligned assessments via computer and over the internet it will be possible – for the first time in public education – to realize the economies of scale and cost-savings necessary to begin to deploy a truly transformative student assessment system.

To help states transition to next generation, CCSS-aligned assessments, the U.S. Department of Education (ED) has provided over $350 million, including from its Race to the Top competition, to fund four state assessment consortia:

- **Partnership for the Assessment of Readiness for College and Careers (PARCC).** The Partnership for the Assessment of Readiness for College and Careers (PARCC) is an alliance of 24 states working to develop a common set of K–12 assessments aligned to the CCSS in English and mathematics, anchored in what it takes to be ready for college and careers. PARCC's assessment design consists of three through-course assessments given throughout the year and an end-of-year comprehensive assessment in English language arts and mathematics. An optional fourth through-course assessment in speaking and listening will also be available. See: http://www.parcconline.org

- **SMARTER Balanced Assessment Consortium (SBAC).** Similar to PARCC, the SMARTER Balanced Assessment Consortium (SBAC) is a consortium of 30 states developing a student assessment system aligned to the CCSS. In contrast to PARCC, SBAC will offer computer-adaptive summative exams twice each year. Although formative assessments will be optional, teachers will be provided with a variety of tools, processes, and practices to aid them in implementing informal, ongoing assessment. See: http://www.k12.wa.us/SMARTER/default.aspx

- **Dynamic Learning Maps (DLM).** The Dynamic Learning Maps (DLM) is a consortium of 13 states, focused on developing an alternate assessment system for students with significant cognitive disabilities. The system will assess students' learning throughout the year and will use items and tasks embedded in day-to-day instruction. The end-of-year summative assessment will be optional. See: http://dynamiclearningmaps.org

- **National Center and State Collaborative (NCSC).** National Center and State Collaborative (NCSC) is a consortium of 19 states developing a system of assessments supported by curriculum, instruction, and professional development to ensure students with significant cognitive disabilities achieve increasingly higher academic outcomes and leave high school ready for postsecondary options. See: http://www.cehd.umn.edu/nceo/projects/NCSC/NCSC.html

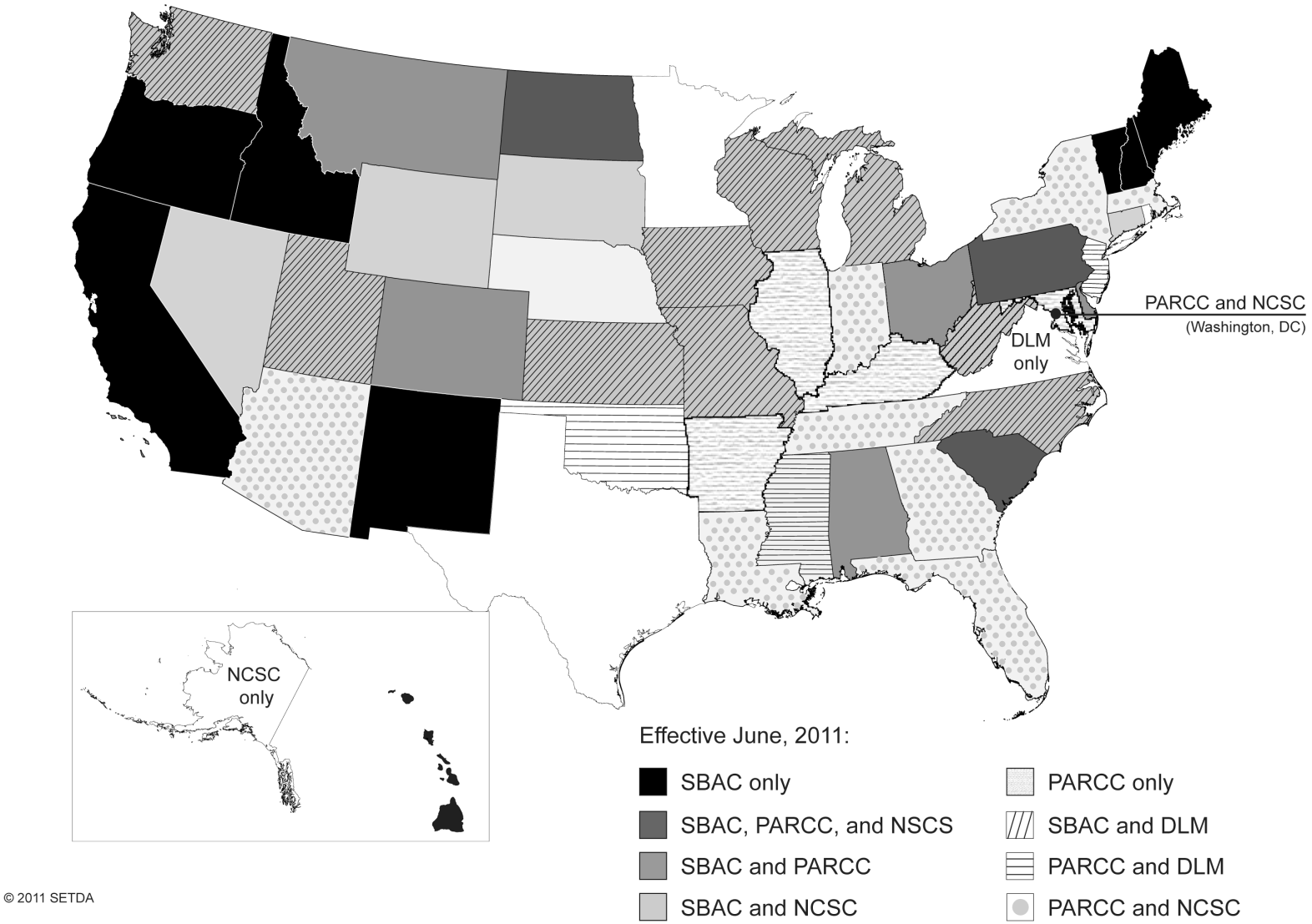
While state participation in the consortia will likely change over time, Figure 1 below shows which states were participating in the various consortia as of June 1, 2011. The new assessment systems developed by these consortia will be implemented starting with the 2014-15 school year.

Collectively, these new assessment systems will be designed to:

- Effectively measure individual student mastery of the CCSS;
- Assess high-order and college- and workforce-readiness skills;
- Use a mix of different test item formats;
- Inform and improve the quality of teaching by identifying professional development, and guiding instruction;
- Move beyond snapshots of student achievement and indicate whether or not students are on-track over time;
- Provide richer and instructionally timely information to students, teachers, parents and policymakers; and
- Leverage new technologies, such as an online platform for administration, scoring, and reporting

With the above expectations in mind, by 2014-15 state assessment systems will look significantly different from the systems in use in most states today.

Figure 1. Common Core State Standards Assessment Consortia



Purpose and Overview of the Report

On April 15, 2011, ED hosted the first in a series of public meetings of the Race to the Top Assessment (RTTA) Consortia. This first meeting was focused solely on the topic of state and district technology readiness. At that meeting, members of the assessment consortia expressed the concern that states and school districts were in need of immediate guidance on technology purchasing. Some were proceeding with plans to make technology upgrades, but were unsure if their investments would be sufficient to accommodate a new assessment system; others were anxious to conduct gap analyses between the infrastructure they had in place and what would be needed to participate. Still others were concerned that the technology being used for teaching and learning in their classrooms might not be suitable for test delivery. Yet, since it would be a number of months before detailed specifications would be known, representatives of both SBAC and PARCC asked the State Educational Technology Directors Association (SETDA) to aggregate existing technology requirements for large-scale online testing in use by states today. This information could inform the field by offering what would be an absolute minimum floor for technology purchasing decisions until such time as the consortia were in a position to offer more details.

To that end, this report provides a snapshot of the current technology requirements for select states implementing large-scale, online summative assessments (and for formative and other assessments when available). Specifically, this report provides a general overview – as well as state-by-state profiles – of the following factors:

- Year the state first offered online testing in any subject for any student population;
- Whether the assessments are mandatory or voluntary;
- Which subjects and grade levels are tested online;
- Consortia to which the state belongs;
- The current online testing vendor(s);
- Published basic hardware and operating system specifications;
- Published web browser and other software requirements;
- Published bandwidth and connectivity requirements; and
- Testing environment details, such as the number of computers and/or special testing classroom/lab environment specifications.

The purpose of the report is not to assess any state's technology infrastructure readiness for the assessments being developed by the four consortia, nor is the report meant to be a comprehensive or critical examination of what is needed for an online assessment system.

Rather, it focuses on the current "nuts and bolts" of hardware, software and bandwidth requirements. Nonetheless, factors such as the length of the testing window, training, and professional development also are critically important issues to consider.

Furthermore, the report makes no recommendation regarding the gold standard technology infrastructure necessary to implement the new assessments and would note the possibility that the consortia may ultimately require different configurations based on the design of their assessment systems. However, we do present a list of issues for the consortia and states to consider as they make decisions regarding their technology requirements for initial implementation by 2014-15 and beyond.

The remainder of this report is organized into four sections:

1) Methodology,
2) Summary of findings,
3) Technology-related issues to consider, and
4) Specifications of states' online assessment systems.

Methodology

Information compiled in this report comes from multiple sources. In the fall of 2010, SETDA conducted a survey of its membership on state experiences with the shift to online assessment. The SETDA survey served as our baseline and was supplemented and updated via numerous sources, including via publicly available information on state department of education websites and through contact with several major online assessment system vendors, including American Institutes for Research (AIR), CTB/McGraw-Hill, Houghton Mifflin Harcourt, Measured Progress, and Pearson. We requested information from these firms on the states they serviced and the technology requirements for the assessments they administer.

SETDA then created a profile of each state, and state technology directors were contacted to coordinate verification of the data contained in that profile.[1] The information presented in this report reflects the data available to SETDA as of June 1, 2011 and is believed to be accurate. Nonetheless, more states may eventually participate or change in their participation in their consortia; online testing vendors do and may change; and assessments may be added or become unavailable.

Please note that we have omitted states that currently are only using online testing for alternate assessments, are only piloting a system, or which are not readily providing information regarding the state's online assessment system on the state's education website.

[1] Mississippi, Rhode Island, and South Dakota profiles were not able to be verified by publication date.

Summary of Findings

Table 2 provides technology specifications for states that are currently implementing large-scale, state-based online summative assessments. We present the states' minimum requirements and, when available, recommended requirements.

Year first offered online testing

Our analysis shows that 33 states offer some level of online testing. Oregon and Virginia were the first two states that started assessing their students online, in 2001, followed by Texas a year later in 2002. Five states — Delaware, Hawaii, Nebraska, South Dakota, and Washington — started their online assessment system with the 2010-11 school year.

Mandatory or voluntary online summative assessments

Although the majority of states assess their students online, only a handful use online testing to assess all or most of their students in grades 3 -12. In Delaware, Hawaii, Idaho, Kansas, and Oregon students are required to take their state assessments online, unless they request a waiver.

Subjects and grade levels tested online

Although states varied widely in terms of online assessments for their state testing of reading and mathematics for grades 3 - 12, over a third, including Florida, Missouri, Oklahoma, and Virginia, offer some or all of their end-of-course exams online. Delaware provides more discrete tests online then any other state.

Consortium the state belonged to

Thirty states are participating in SBAC compared to 24 states with PARCC, 11 with DLM, and 19 with NCSC. Delaware and South Carolina belong to both of the larger consortia. Minnesota, Nebraska, and Texas are the only states that offer online testing but do not participate in any of the consortia. (See Figure 1 for state participation in consortia.)

Summative online testing vendor

Of the 33 states, Pearson is the online testing vendor for eight. Other vendors with multi-state coverage include Measured Progress (six states), AIR and Computerized Assessments & Learning (CAL) with Data Recognition Corporation (DRC) each with four states. Kansas' system is operated by Center for Educational Testing & Evaluation, School of Education at The University of Kansas. North Carolina State University developed and operates North Carolina's online assessment system.

Basic hardware specifications

The current basic hardware specifications are similar across online testing vendors and thus across states. With so many older computers in schools, states set low minimum requirements for computers, but recommend faster processors, more memory, higher screen resolution, and more current operating systems for future purchases. For example, Delaware suggests schools purchasing new computers should purchase ones with 1.3 GHz processor, 2 GB RAM, and 80 GB of hard drive space, much faster and more capacity than

the current 128 MB RAM and 52 to 200 MB of hard drive space in hardware specifications for the 2010-2011 tests.

Different exams within a state may require different hardware specifications. For example, Indiana, where testing is contracted to CTB McGraw-Hill, there are different specifications for the ISTEP+ (for grades 3 - 8) state end-of course exams and Acuity formative assessment system.

Even if the computers meet the minimum requirements, states suggest that schools test their equipment before online assessment sessions to ensure they are working appropriately. Pearson, who operates in Florida, Georgia, Maryland, Mississippi, Oklahoma, Tennessee, and Texas recommends that if a computer takes a noticeably long period of time (e.g., more than 10 seconds) to start and run applications, then it should not be used for high-stakes computer-based testing.

Browser and software specifications

Both newer and older versions of Internet Explorer, Safari, and Firefox are supported in most states. Two states — North Carolina and Washington — even support the most recent version of the Google Chrome browser.

Similar to basic hardware specifications, states running multiple systems may have different browser requirements and need different software applications. For example, Kansas offers student tutorials for online testing, which require the latest version of Flash. However, Flash is not listed as a requirement for the online test itself.

AIR, vendor to Delaware, Hawaii, Minnesota, and Oregon, has created a secure browser for states using its system. The secure browser prevents students from accessing other applications or copying or creating screenshots while they are testing.

Bandwidth and connectivity

Most states recommend wired connectivity. Wireless systems are often deemed suitable but not recommended in most states because of concerns over dead or slow spots in school buildings.

Because of the low bandwidth at many schools, most vendors recommend that schools download optional local caching software to alleviate internet bandwidth demands during testing windows.

All states require a “fast” internet connection but only some provided guidelines on what “fast” means. The reason for this may be the great variability on the number of students being tested as well as the nature of the assessment itself. More students being tested simultaneously increases internet bandwidth demands. Exams that require a great deal of interactivity (via, e.g., Flash) will also require greater capacity.

Measured Progress, operating in Utah and Rhode Island, recommends 64 kb/sec per student. With that capacity, they assert a school with a T1 connection should be able to

adequately provide 24 simultaneous connections. A T3 connection should serve 672 simultaneous connections. Pearson recommends a minimum of 6 kb/sec of network bandwidth end-to-end for each user for assessment. CAL and DRC, who operate in Washington, South Carolina, Nebraska, and Idaho claim a T1 connection can support between 100 to 150 users. Installing local caching software could dramatically increase the number of users to 1,500. In contrast, AIR recommends that the internet connection's typical response time should be able to provide the next question for students in less than half a second.

Regardless of the bandwidth and connectivity theoretically available, states recommend that schools test their capacity for the particular exams and number of students that will be assessed. The online assessment system should be responsive and not cause additional stressors to the student.

Table 1 is an example of bandwidth estimates provided by the Louisiana State Department of Education for schools and districts participating in their online testing program, which is operated by Pacific Metrics Corporation. For School 1, 20 concurrent testers in Algebra I each require 1.8 kb/s bandwidth speed for a total of 36 kb/s for the Algebra I class. If each of the other classes is testing concurrently, School 1 will need 142 kb/s download bandwidth capacity. Note that this bandwidth requirement must be in addition to the normal day-to-day bandwidth capacity needed for teaching and learning, communications, and management/accountability systems.

Table 1. Louisiana's Example District Bandwidth Calculations for Online Assessment

School/ District	Algebra I	English II	Geometry	Biology	English III (Field Test)	Total for School/ District
School 1	20 x 1.8 = 36 kb/s	20 x 0.9 = 18 kb/s	20 x 1.8 = 36 kb/s	20 x 1.7 = 34 kb/s	20 x 0.9 = 18 kb/s	**142 kb/s**
School 2	50 x 1.8 = 90 kb/s	30 x 0.9 = 27 kb/s	30 x 1.8 = 54 kb/s	30 x 1.7 = 51 kb/s	30 x 0.9 = 27 kb/s	**249 kb/s**
School 3	100 x 1.8 = 180 kb/s	50 x 0.9 = 45 kb/s	50 x 1.8 = 90 kb/s	50 x 1.7 = 85 kb/s	50 x 0.9 = 45 kb/s	**445 kb/s**
School 4	20 x 1.8 = 36 kb/s	30 x 0.9 = 27 kb/s	30 x 1.8 = 54 kb/s	40 x 1.7 = 68 kb/s	30 x 0.9 = 27 kb/s	**212 kb/s**
Entire District	342 kb/s	117 kb/s	234 kb/s	238 kb/s	117 kb/s	**1,048 kb/s**

Testing Environment

None of the states had policies that required a certain number of computers per school or classroom. But, states did recommend that there were enough computers either in a computer lab or mobile carts to allow for an entire classroom to be tested at the same time. Similar to paper-and-pencil test administration, the classroom, lab, or testing area should

be quiet, comfortable, well lit and free of any instructional materials. Students also should not be able to view other students' monitors.

Technology-Related Issues to Consider

The shift from paper-and-pencil assessments to computer-based, online assessment comes with a number of issues that will need to be systematically addressed by states and the consortia for the initial implementation in 2014-15 and beyond. While not an exhaustive list, we believe these technology-related issues include:

1. **Striking the right balance in specifying technology requirements, while recognizing the heterogeneity of the technology in use in schools today and tomorrow;**

   The nationwide movement toward computer-based and online assessment will for the first time require states and districts to evaluate their technology infrastructure against a common meaningful use. This will generate a healthy dialogue about the sufficiency of school technology access, which will help us to identify and close existing gaps. Yet, it also will require some degree of flexibility and judgment. Within and across states and districts, schools have deployed – and will continue to deploy – a variety of technologies (including devices, operating systems, software choices, and network configurations) to meet their instructional needs. New devices and applications will continue to come to market. The forthcoming technology requirements to be issued by the consortia will need to strike the right balance so as not to overly constrain or limit the use of technology tools for teaching and learning in order for schools to participate in new assessment systems. The assessment consortia should be wary of inadvertently picking long-term winners and losers amongst technology providers and solutions, especially for those with the potential to save schools money and/or develop breakthrough technologies of benefit to teaching and learning.

2. **The specifications for test administration – including especially the length of the testing window – may have the single greatest impact on school technology readiness for computer-based and online assessment;**

   Sufficiency of school technology and infrastructure is a function of the number of simultaneous users. Any capacity calculations also must consider not only the demands generated by those taking the assessment, but those day-to-day needs for bandwidth capacity for teaching and learning, communications, and management/accountability systems. Shorter, static testing windows will require more computers and more bandwidth and cause greater disruption to those across a school district than testing windows that are wider or are available on demand for students ready to demonstrate mastery at their own pace.

3. **Coordinating technology requirements, management, and related costs for assessment with other educational technology investments;**

   The shift to computer-based and online assessment is only one part of a larger and longer-term shift in K-12 education toward digital instructional materials, online learning, data systems, formative assessment, online professional development, and school communications tools. Planning, deploying and managing these investments (increasingly being made at the scale of the state) and ensuring that they can become part of a single, interoperable system will be vital to both their being cost-effective and easy to use. Determining equipment purchases, bandwidth requirements, technical support and professional development needs all must be done in a coordinated fashion. This also provides a unique opportunity to re-think categorical budgetary constraints. States could consider re-directing and combining funds in new ways to meet technology needs.

4. **Employing IT industry best practices to extract cost-savings via the shift to computer-based and online assessment;**

   The consortia have an opportunity to architect a secure, web-based national and/or regional technology infrastructure that could radically reduce the need for every individual school to purchase and maintain expensive servers and networking equipment. The use of open source applications, open educational resources (OER), and open metadata standards will ensure that states can easily share resources instead of each purchasing and/or developing and maintaining their own systems. And, innovations in automated scoring also hold promise in reducing the costs of administration.

5. **Creating processes and plans to both take advantage of future technology innovations and to take out of service obsolete technology;**

   Change is the constant in the technology field, with rapid development and deployment cycles regularly occurring at a pace much faster than those in education administration have typically planned and budgeted. While education is unlikely anytime soon to be able to keep up with the pace of innovation occurring in other sectors, the consortia have an opportunity to clearly communicate long-term plans for phasing in new innovations (perhaps after a series of rapid and regular pilot tests), while also planning for obsolescence. One useful idea may be to publish a list of devices, operating systems, and software that will not be supported by any new computer-based and online assessments once they are deemed to be obsolete at specific future points in time (e.g., for past generations of operating systems no longer supported by their manufacturer).

6. **Architecting a system that can accommodate the trend away from seat time requirements and toward increasing online and blended (part-online, part face-to-face settings) enrollments;**

   While most schools across the country look remarkably comparable in terms of how they structure the school day, organize students in classrooms, make use of instructional materials, and assign students to teachers, increasingly we are seeing examples of state policy changes (such as eliminating seat time requirements) that facilitate new technology-enhanced school experiences. Some of these models encourage students to move at their own pace through the curriculum, for instance, through online and blended learning approaches or by offering in-school credit for out-of-school learning experiences. Any new assessment systems should recognize these shifts and be able to accommodate their alternate approaches to ensuring that every student has the chance to receive a high-quality public education.

7. **Striking and maintaining the right balance between comparability and validity in implementing next generation assessment systems;**

   Variations in testing mode and setting, especially those that interact with student demographic characteristics, are important to observe to ensure that comparability across students being tested and over time is maintained. At the same time, the CCSS envisions students who are college and career-ready will have a facility with the range of tools they will be required to use to be successful in those settings. This also will serve to reinforce the long-term trend of greater integration of technology into teaching and learning. Given the constancy of change in technology tools and their functionality and the importance of student comfort and facility in using them to be successful in work, life and citizenship, the consortia will need to strike and maintain the right balance in ensuring technical comparability with over-arching validity concerns. There is a danger that assessment systems could fall out of sync with the ways that students are using technology for learning and how they will be expected to work and demonstrate competence in the future once they leave school.

8. **Providing meaningful opportunities for students and teachers to become comfortable with the assessment technology prior to implementation; and**

   While many students will quickly become comfortable with computer-based administration of assessments, it will be beholden on states and the consortia to ensure that all students have sufficient exposure to new modes of testing technology in advance of the assessments themselves. Classroom teachers will likely bear the brunt of this responsibility, which increases the burden on states and the consortia to phase in meaningful educator professional development opportunities beginning in the 2011-12 school year.

9. Coordinating work with state and district technology leadership.

The development and deployment of a new generation of computer-based and online mandatory student assessments is at least as much a technology initiative as an assessment initiative. The deployment and management of the existing technology infrastructure in schools has and needs to be overseen by those with technology expertise and a deep understanding of its use in schools. Moreover, the use of technology for assessment will not occur in isolation, as other investments are being made in the use of technology for teaching and learning. State assessment and technology leaders will need to forge new partnerships for an initiative of this complexity and scale to be successfully implemented.

Table 2. Specifications of States Online Assessment System

State	Online Testing First Offered	Mandatory or Voluntary	Subjects and Grade Level Tested	Consortium
Delaware	2010	Mandatory	End-of-Course: English II, Algebra I, Integrated Math I, Biology, U.S. History Mathematics Grades 2-10 Reading Grades 2-10 Science Grades 5, 8, & 10 Social Studies Grades 4 & 7	PARCC SBAC
Florida	2006	Mandatory	FCAT Reading and Mathematics Retakes FCAT Mathematics Grade 10 End-of-Course Algebra I Postsecondary Placement (ISS) and Diagnostic: Elementary Algebra, Intermediate Algebra, College Algebra, Developmental Reading, Developmental Writing, Freshman Composition	PARCC NCSC
		Voluntary	FCAT Reading Retakes End-of-Course: Geometry and Biology 1	
		Field Testing	2011-12 school year: End-of-Course U.S. History Field Test and FCAT 2.0 Reading Grade 7 will be added as computer-based tests.	

State	Online Testing First Offered	Mandatory or Voluntary	Subjects and Grade Level Tested	Consortium
Georgia	2003	Voluntary	End-of-Course: - Mathematics I: Algebra/Geometry/Statistics - Mathematics II: Geometry/Algebra II/Statistics - Social Studies: U.S. History, Economics/Business/Free Enterprise - Science: Biology, Physical Science - English Language Arts: 9th grade Literature and Composition, American Literature and Composition Grades 3,5,8 Reading and Math CRCT Re-test	PARCC NCSC
	2010	Voluntary	Students can also access the Online Assessment System to access tests that consist of the same kind of questions as appear on the state's assessments in Reading, English/Language Arts, Mathematics, Science, and Social Studies in the Criterion-Referenced Competency Tests (CRCT), the End of Course Tests (EOCT), and Georgia High School Graduation Tests (GHSGT)	
Hawaii	2010	Mandatory	Hawaii State Assessments (HSA) Reading: Grades 3-8 & 10 HSA Mathematics: Grades 3-8 & 10 HSA Science: Grades 4, 8, & 10 TerraNova Mathematics and Reading: Grades 3-8 & 10	SBAC

State	Online Testing First Offered	Mandatory or Voluntary	Subjects and Grade Level Tested	Consortium
Idaho	2005	Mandatory	Idaho Standards Achievement Tests (ISAT) Mathematics, Reading, Language Usage: Grades 3-8, 10-12 Science: Grades 5, 7, and 10	SBAC
Indiana	2006	Mandatory Voluntary Voluntary	Acuity Formative Assessments for Mathematics, English/Language arts, Science and Social Studies (Grades 3 - 8) ISTAR (for students who are unable to take the ISTEP+) Indiana Statewide Testing for Educational Progress-Plus (ISTEP+) Multiple-Choice Assessment: Grades 3-8 English Language Arts and Mathematics; Grades 4 and 6 Science, Grades 5 and 7 Social Studies End-of-Course Assessments (ECA): Algebra I, English 10, Biology 1	PARCC NCSC
Kansas	2004	Mandatory	Reading and Mathematics: Grades 3-8 and 11 Science: Grades 4, 7, and 11 History/Government: Grades 6, 8 and once in high school on even-numbered years. High School OTL assessments are available 2010-2011 grades 9 and 11. History/government testing is not available for grades 6 and 8 in 2010-2011. The cohort year for high schools is grade 12.	SBAC DLM

State	Online Testing First Offered	Mandatory or Voluntary	Subjects and Grade Level Tested	Consortium
Louisiana	2006	Voluntary	End-of-Course Test: Algebra I, English II, Geometry, Biology, English III is being field tested Practice Assessment/Strength Skills (PASS) practice tests PreK – 12th grade: The activities are designed to help Louisiana students prepare for the LEAP, GEE, iLeap, LAA2, and End-of-Course exams. The resource includes tests in English Language Arts, mathematics, science, and social studies.	PARCC NCSC
Maryland	2007	Voluntary	Maryland School Assessment (MSA) Science Grades 5 and 8, Modified MSA Reading and Mathematics Grades 3 – 8, High School Assessment (HSA), Mod HSA	PARCC
Minnesota	2007	Mandatory Voluntary	Mathematics Test for English language learners (MTELL). Retired spring 2010. (alternative to Mathematics MCA) Science MCA Grades 5, 8, and high school Reading and Mathematics Graduation Required Assessments for Diploma (GRAD) Retests Mathematics MCA-Modified, grades 5-8 Mathematics MCA, grade 3-8	None
Mississippi	2004	Voluntary	Mississippi Subject Area Testing Program: Algebra I, Biology I, English II, and U.S. History from 1877	PARCC DLM

State	Online Testing First Offered	Mandatory or Voluntary	Subjects and Grade Level Tested	Consortium
Missouri	2008	Mandatory Voluntary	End-of-Course Assessments: English II, Algebra I, Biology, US Government English I, Algebra II, Geometry, US History	SBAC DLM
Nebraska	2010	Voluntary	NeSA Reading and Mathematics: Grades 3-8 and 11 NeSA Science items are currently being field tested in grades 5, 8, and 11 NeSA Writing is currently being piloted with 11th graders	None
North Carolina	2006	Voluntary	End-of-Course Tests: English I, Civics & Economics, U.S. History, Algebra I & II, Biology, Physical Science	DLM
Oklahoma	2007	Mandatory Voluntary	End-of-Instruction (EOI): Algebra I, Algebra II, Geometry, English II, English III, Biology I, and U.S. History Oklahoma Core Curriculum Tests (OCCT): Grade 7 & 8 Mathematics and Reading Oklahoma Core Curriculum Tests (OCCT): Grades 3, 4 & 6: Mathematics and Reading Grade 5: Mathematics, Reading, Science, and Social Studies Grade 7: Geography Grade 8: Science, and U.S. History, Constitution, and Government Oklahoma Modified Alternate Assessment Program (OMAAP) for Grades 3-8 and EOI	PARCC DLM

State	Online Testing First Offered	Mandatory or Voluntary	Subjects and Grade Level Tested	Consortium
Oregon	2001	Mandatory	Oregon Assessment Knowledge System (OAKS) Online: Grades 3-8 and 11: Reading/Literature and Mathematics Grades 5, 8, and 11: Science Grades 5, 8, and 11: Social Studies Grade 7 and 11: Writing Grade 3: Spanish Reading/Literature ELPA: All grades	SBAC
Rhode Island	2008	Mandatory Voluntary	8th Grade TechLiteracy Assessment Grade 11 NECAP Reading and Mathematics Assessment Grade 4, 8, & 11 NECAP Science Assessment (May be piloting writing exam Fall 2011)	PARCC NCSC
South Carolina	2005	Voluntary	End-of-Course Exams: Algebra 1/Mathematics for the Technologies 2, English 1, Physical Science, United States History and the Constitution, Biology 1/Applied Biology ePortfolio Assessment for students K-12	PARCC SBAC NCSC
South Dakota	2010	Voluntary	State-Created End-of-Course/Course Equivalency Exams: Biology I, Chemistry, Physical Science, Physics, Algebra I & II, Geometry Spanish, Geography, Government, US History, World History	SBAC NCSC
Tennessee	2009	Mandatory	Gateway Exams: Mathematics, Language Arts, and Science	PARCC NCSC

State	Online Testing First Offered	Mandatory or Voluntary	Subjects and Grade Level Tested	Consortium
Texas	2002	Mandatory Voluntary	Texas English Language Proficiency Assessment System (TELPAS) Grades 2 - 12 Texas Assessment Knowledge and Skills (TAKS) Exit Level: English Language Arts, Mathematics, Science, Social Studies End-of-Course Grades: Algebra I & II, Biology, Chemistry, English I, II, and III, Geometry, Physics, U.S. History, World Geography & World History	None
Virginia	2001	Mandatory Voluntary	End-of-Course: English, Virginia Studies, United States History I & II, World Geography, Algebra I, Earth Science, Biology, Chemistry, Geometry, Algebra II Reading and Mathematics Grades 3-8 Science Grades 3, 5, & 8 Social Studies Grades 3 History Grade 3 Algebra I, Virginia Studies, United States History I & II, World Geography Civics, and Economics	DLM
Washington	2010	Voluntary	Measurement of Student Progress: Reading and Math Grades 4-8; Science Grades 5 & 8	SBAC DLM
West Virginia	2008	Mandatory	West Virginia Educational Standards Test (WESTEST) 2 writing Grades 3 – 11 Acuity Formative Assessments for Mathematics, English/Language arts, Science and Social Studies (Grades 3 through 8)	SBAC DLM

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Delaware	AIR	***Current Computers: Windows*** 2000 and higher w/Pentium 233 MHz, 128 MB RAM, 52 MB hd space ***MAC OS X*** and higher w/Intel x86 or PowerPC G3, G4, or G5 processor, 128 MB RAM, 200 MB hd space ***Linux*** w/Pentium II or AMD K6-III, 233 MHz, 64 MB RAM, 52 MB hd space ***New Purchase:*** 1.3 GHz processor, 2 GB RAM, 80 GB hd 1024x768 screen resolution	Student Testing: Secure browser that prevents access to other applications and copying or creating screenshots Other Applications, such as TA Training Site, Student Training Site, Online Reporting System: ***Windows*** 2000: Firefox 2.0-3.6; IE 6; Windows XP: Firefox 2.0-3.6, IE 6 or higher; Windows Vista: Firefox 3.0-3.6, IE 7 or 8; Windows 7: Firefox 3.0-3.6; IE 8 ***Mac OS X*** 10.3: Firefox 2.0-3.6; Mac OS X 10.4: Firefox 2.0-3.6, Safari 3; Mac OS 10.5: Firefox 3.0-3.6, Safari 3 and above; Mac OS 10.6: Firefox 3.6, Safari 4 & 5 ***Linux*** K12LTSP: Firefox 2.0-3.5 Recommended for All OS: Firefox 3.5 and above Flash 10 and above must be enabled for Online TA Certification Course, Online Reporting System, and Training Test if Firefox is used.	Wired or wireless Typical response time = provide the next question for students is less than one-half second but will depend on reliability of connection

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Florida	Pearson	***Windows*** XP (SP 3): Pentium III 733 MHz processor; 512 MB RAM; Windows Vista (SP 1): Pentium III 1 GHz processor; 1 GB RAM; Windows 7: Pentium III 1 GHz processor; 1 GB RAM; ***Mac OS X*** 10.4: G3, G4, G5 500 MHz processor; 512 MB RAM; 10.5: Intel, G4, G5 867 MHz processor; 512 MB RAM; Mac OS X 10.6: Intel processor; 1 GB RAM ***Minimum requirements:*** 500 MB available disk space; 1024x768 screen resolution; Keyboard and mouse (or other pointing device) (For an optimal student experience, any computer that takes a noticeably long period of time (e.g., more than 10 sec) to start and run applications, even computers which meet the above requirements, should not be used for high-stakes computer-based testing, if possible.	Browser used for administrative access and test management. ***Windows*** XP (SP 3): IE 6.0 or higher; Firefox 2.0 or higher; Safari 3.0 or higher; Windows Vista: IE 7.0 or higher; Firefox 3.0 or higher; Safari 3.0 or higher; Windows 7: IE 8.0 ***Mac OS X*** 10.4: Safari 2.0 or higher; Firefox 2.0 or higher; Mac OS X 10.5: Safari 3.0 or higher; Firefox 3.0 or higher; Mac OS X 10.6: Safari 4.0 or higher; Firefox 3.0 or higher Software application for test delivery: TestNav 6.9.	Wired or wireless High-speed internet connection TCP/IP Districts and schools can test out bandwidth at their locations using the SystemCheck Tool: http://www.FLAssessments.com/SystemCheck

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Georgia	Pearson	**End-of-Course:** ***Windows Recommended:*** Pentium 4 (1.3 GHz); 256 MB RAM; 512 MB RAM (for Flash-based tests); 500 MB available disk space ***Mac OS X Recommended:*** G4 (800 MHz) or G5; 1 GB RAM; 500 MB available disk space Mouse/Pointing Device; 1024x768 screen resolution; Headphones/Speakers	**End-of-Course:** ***Windows*** EX (SP 3): IE 6.0 or higher; Firefox 2.0 or higher; Safari 3.0 or higher; Windows Vista: IE 7.0 or higher; Firefox 3.0; Safari 3.0 or higher ***Mac OS X*** 10.4: Safari 2.0 or higher; Firefox 2.0 or higher; Mac OS X 10.5: Safari 3.0 or higher; Firefox 3.0; Mac OS X 10.6: Safari 4.0; Firefox 3.0	**End-of-Course:** TCP/IP Min 6 Kilobits/sec of network bandwidth end-to-end for each user
	CTB McGraw-Hill	**CRCT retests:** ***Windows Recommended:*** 1.0 GHz processor; 1.3 GHz processor; 512 MB of memory; 200 MB disk space available; 1 GB; Windows 2000 SP4, XP SP3, Vista SP 1, Windows 7 ***Mac OS X Recommended:*** 1.8 GHz Intel processor; 512 MB of memory; 200 MB disk space available; 1 GB; OS 10.4.8, 10.5.4, or 10.6 Intel Min of 800x600 screen resolution; Min color display: 256 colors (8-bit)	**CRCT retests:** ***Windows*** PC: no browser basic specs, Adobe Air, Flash Player, Java Runtime Environment™ (JRE) 5.0, Update 7 ***Mac:*** Safari® 2.0 or Firefox® 2.0 (Note: Safari required for test delivery on student workstations.)	**CRCT retests:** High-speed internet connection: Minimum 1.5 Mbps upload and download –T1, high-speed cable, or high-speed DSL.

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Hawaii	AIR	***Windows*** (2000, XP, Vista, 7): Pentium 233 MHz, 128 MB RAM; 52 MB hard drive ***Mac OS X*** (10.3-10.6): Intel x86 or PowerPC G3, G4, or G5 processor, 128 MB RAM, 200 MB hard drive ***Linux (K12LTSP):*** Pentium II or AMD K6-III 233 MHz, 64 MB RAM; 52 MB hard drive ***Recommended:*** 1.3 GHz processor, 2 GB RAM, 80 GB hard drive Recommended min screen size 11.6 inches; 1024x768 resolution; Headphones; Printers (Test administrators can print assessment session info)	Student Testing: Secure browser that prevents access to other applications and copying or creating screenshots Other Applications, such as TA Training Site, Student Training Site, Online Reporting System: ***Windows*** 2000: Firefox 2.0 3.6; IE 6; Windows XP: Firefox 2.0-3.6, IE 6 or higher; Windows Vista: Firefox 3.0-3.6, IE 7 or 8; Windows 7: Firefox 3.0-3.6; IE 8 ***Mac OS X*** 10.3: Firefox 2.0-3.6; Mac OS X 10.4: Firefox 2.0-3.6, Safari 3; Mac OS 10.5: Firefox 3.0-3.6, Safari 3 and above; Mac OS 10.6: Firefox 3.6, Safari 4 & 5 ***Linux K12LTSP:*** Firefox 2.0-3.5 Recommended for All OS: Firefox 3.5 and above Flash 10 and above must be enabled for Online TA Certification Course, Online Reporting System, and Training Test if Firefox is used.	Wired or Wireless Average response time for the online assessment system to provide the next question to students is less than one-half second

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Idaho	Computerized Assessments & Learning and Data Recognition Corporation	***Windows*** 98, NT, ME, 2000, XP, 2003, Vista, 2008, 7 ***Mac OS X*** 10.3 (w/ Java 1.4)/10.4 Memory 64 MB of Ram (128 MB recommended); CPU/Processor 200 MHz or higher; Screen resolution min 800x600; Video adapters min 8 MB of memory **Audio Accommodations:** **- *Windows:*** Windows 98 and above, sound card; at least 128 MB of RAM; Microsoft SAPI 5.1 Redistributable (for older Windows) ***Windows and Mac OS X:*** Cepstral David voice **LCS requirements:** ***Windows:*** 98, NT, ME, 2000, XP, 2003, Vista, 2008/7 ***Mac OS X:*** 10.3 (w/Java 1.4), 10.4, and above Processor 1.2 GHz; Memory 512 MB, 1 GB recommended; 512 MB of disk space	LCS software Student tutorials require Flash version 7r63 or higher	LCS configuration can support 1500 simultaneous testers

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Indiana	CTB McGraw-Hill	**ISTEP+ (Grades 3-8)** ***Windows*** 2000 SP4, XP SP3, Vista SP1, Windows 7 ***Mac OS X*** 10.4.8, OS 10.5.4 or OS 10.6 Intel ***Linux*** Fedora Release 11, OpenSUSE 11.1, or Ubuntu 9.04 1.0 GHz processor (1.3 GHz recommended); 512 MB of memory 200 MB disk space available (1 GB recommended); 800x600 screen resolution; Min color display 256 colors (8-bit); Keyboard and Mouse **State Assessment System: ECA (High School)** ***Admin: Windows*** OS 98 or above ***Students: Windows*** 98, SE, XP, Vista, 7 ***Mac: OS X*** 10.4 or above 1024 x 768 minimum screen resolution	**ISTEP+ (Grades 3-8)** ***Windows and Linux:*** IE 6.0 or 7.0 or Mozilla Firefox (for Admin only; none required for testing); Adobe AIR; Java Runtime Environment JRE 5.0 Update 16 ***Mac OS X:*** Safari 2.0 or Firefox 2.0 (Note: Safari required for test delivery on student workstations)***;*** Flash Player 9; Java Runtime Environment JRE 5.0 Update 7 **State Assessment System: ECA (High School)** ***Windows:*** IE 6.0 or higher; or Mozilla Firefox 2.0 or higher***;*** Java Runtime environment JRE 1.5 or higher ***Mac OS X:*** Mozilla Firefox 2.0 or higher; or Safari 1.2 or higher	**ISTEP+ (Grades 3-8)** ***Bandwidth:*** Min 1.5 Mbps upload and download – T1, high speed cable or high-speed DSL required for every 50-100 concurrent users ***Web Browser:*** Configured to be SSL capable (SSL 2.0 and SSL 3.0) **State Assessment System: ECA (High School)** ***Bandwidth:*** Minimum 1.5 mbps or more

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Indiana Cont…		**Acuity Formative Assessment System** ***Windows*** 2000, XP 500 MHz Pentium processor or higher ***Mac OS X*** 10.3.9, 10.4.11, 10.5.6 PowerPC G5 or Intel-based processor 128 MB of virtual memory; 128 MB (256 MB memory preferred); Mouse/pointer	**Acuity Formative Assessment System** ***Windows*** XP: IE 6.0 or 7,0; or Firefox 3.0.5; Windows 2000: IE 6.0; or Firefox 1.5.0.12; RealPlayer 6.0 10, or Windows Media Player 10 or 11; Microsoft Excel V2003 or 2007 (Admin); Adobe Reader 8; Adobe Flash Player 9.0 or 10 ***Mac OS X***: Safari 3.0.4 (Mac OS 10.5.6); Safari 1.3.2 (Mac OS 10.3.9); Firefox 2.x/Safari 3.0.4 (Mac OS 10.4.11) – (Note: Item authoring not supported in Safari)***;*** Icab 3.03 (Test taker-students)***;*** QuickTime 7.1.5 for sound files***;*** Microsoft Excel 2004 or 2008 (Admin)***;*** Adobe Reader 5.0, 7, 8.10, or 9***;*** Adobe Flash Player 9.0 Cookies enabled; ActiveX enabled; AutoComplete set to "off"; Ability to allow pop-ups	**Acuity Formative Assessment System** ***Bandwidth:*** LAN connected (TCP/IP 10mbps or faster)

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Kansas	Center for Educational Testing & Evaluation, School of Education, The University of Kansas	***Windows*** 98, NT, ME, 2000, XP, 2003, Vista 7 ***Mac OS X*** 10.3.9 to 10.6.2 Memory 64MB of RAM (128MB recommended); 800x600 screen resolution; Video adapters min 8 MB of memory; 300 MHz or higher processor **Audio Accommodations:** ***Windows:*** Windows 98 and above, sound card; min 128 MB of RAM; Microsoft SAPI 5.1 Redistributable (for older Windows) ***Windows and Mac OS X:*** Cepstral David voice **LCS requirements:** ***Windows:*** 98, NT, ME, 2000, XP, 2003, Vista, 2008/7 ***Mac OS X*** 10.3. (w/Java 1.4), 10.4, and above, Linux Processor 1.2 GHz; Memory 512 MB, 1 GB recommended; Disk space min 512 MB of free space	KCA software LCS software Student tutorials require Flash version 7r63 or higher	A T1 connection can support at least 64 users. Local Caching Server reduces up to 70% the bandwidth requirements. If more than 1,000 simultaneous users are to be tested, you might want to set up more than one LCS.

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Louisiana	Pacific Metrics Requirements	***Windows minimum*** 2000, XP: Processing Speed/Model: 233 MHz Intel; Pentium 4; RAM: 128 MB ***Windows recommended*** XP, Vista, 7; Processing Speed/Model: 1.5 GH; Intel Core Duo; RAM: 512 MB ***Mac OS X*** 10.4.11 or 10.5: Processing Speed/Model: 1.83 GHz Intel Core Duo: RAM: 512 MB 1024x768 screen resolution (optimal but should not go below 800x600) **PASS System Requirements:** ***Windows*** 7, Vista, XP, or 2000 ***Mac OS X*** 10.4.11 or more recent 800x600 or higher screen resolution; Sound card (for tests read aloud and tutorial audio)	***Windows:*** IE 6, 7, or 8 with Java scripting ***Mac:*** Safari 3.0.4, 4, or 5 with Java scripting Adobe Flash Version 8.0 or more recent; Adobe Scalable Vector Graphics (SVG) Viewers 3.03 Computers used by students with the accommodation *Tests Read Aloud* must be configured to support MP3 files. ***PASS System Requirements:*** ***Windows:*** IE 8, 7, or 6 ***Mac OS X:*** Safari 5, 4, or 3 JavaScript enabled and Cookies enabled in the browser; Flash Player 9 or later	High Speed Internet Bandwidth requirements for Wired Local Area Network (LAN) and Wireless Local Area Network (WLAN) - Algebra I: Download 1.8 kilobit/sec; Upload 0.006 kilobit/sec - English II & III: Download 0.9 kilobit/sec; Upload 0.012 kilobit/sec - Geometry Download 1.8 kilobit/sec; Upload 0.007 kilobit/sec - Biology: Download 1.7 kilobit/sec; Upload 0.006 kilobit/sec

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Maryland	Pearson	***Windows minimum:*** Pentium III (733 MHz); 256 MB RAM ***Mac OS X minimum:*** G3 500 MHz 512 MB RAM; 500 MB Available Disk; Mouse/Pointing Device; 800x600 screen resolution ***Windows recommended:*** Pentium 4 (1.3 GHz); 256 MB RAM; 512 MB RAM (for Flash-based tests); ***Mac recommended:*** G4 (800 MHz) or G5; 1 GB RAM; 500 MB Available Disk; Mouse/Pointing Device; 1024x768 screen resolution; Headphones/Speakers	TestNav does not require a browser. Pearson Access requires a browser. Windows EX (SP 3): IE 6.0 or higher; Firefox 2.0 or higher; Safari 3.0 or higher ***Windows*** Vista: IE 7.0 or higher; Firefox 3.0; Safari 3.0 or higher ***Mac OS X*** 10.4: Safari 2.0 or higher; Firefox 2.0 or higher; Mac OS X 10.5: Safari 3.0 or higher; Firefox 3.0; Mac OS X 10.6: Safari 4.0; Firefox 3.0	Wired or wireless TCP/IP Recommendation: min 6 Kilobits/sec of network bandwidth end-to-end for each user Wireless access points' sustained throughput able to support 43Kbps per workstation

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Minnesota	AIR	***Windows*** (2000, XP, Vista, 7): Pentium 233 MHz, 128 MB RAM; 52 MB hard drive ***Mac OS X*** (10.4-10.6): Intel x86 or PowerPC G3, G4, or G5 processor, 128 MB RAM, 200 MB hard drive ***Linux*** (K12LTSP 4.2+): Pentium II or AMD K6-III 233 MHz, 64 MB RAM; 52 MB hard drive ***Recommended:*** 1.3 GHz processor, 2 GB RAM, 80 GB hard drive Recommended min screen size 11.6 inches; Screen resolution 1024x768; Headphones; Printers (Test administrators can print assessment session info)	Student Testing: Secure browser that prevents access to other applications and copying or creating screenshots Other Applications, such as Training Sites, Online Reporting System: ***Windows*** 2000: Firefox 2.0-4.0 IE 6; Windows XP: Firefox 2.0-4.0, IE 6, 7, 8; Windows Vista: Firefox 3.0-4.0, IE 7, 8, 9; Windows 7: Firefox 3.0-4.0; IE 8 & 9 ***Mac OS X*** 10.4: Firefox 2.0-4.0, Safari 3; Mac OS 10.5: Firefox 3.0-4.0, Safari 3, 4 & 5; Mac OS 10.6: Firefox 3.6-4.0, Safari 4 & 5 ***Linux*** K12LTSP 4.2+: Firefox 2.0-4.0 Recommended for All OS: Firefox 3.5 and above All computers should have Flash 9 or above installed. Flash is bundled with the secure browser.	Wired or Wireless Average response time for the online assessment system to provide the next question to students is less than one-half second

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Mississippi	Pearson/ITS	***Windows*** 98, 2000, XP, Vista: Processor 233 MHz or higher; RAM 256 MB or higher ***Mac OS X*** 10.4 or Mac OS X 10.3: Processor PowerPC G3, G4, or G5, or Intel-based Mac; RAM 256 MB or higher Screen resolution 1024x768 w/16-bit color (recommended 17" or larger monitor)	Pearson's secure browser ***Windows:*** IE 5.5 or newer ***Mac OS X:*** Safari 1.2 or newer	Broadband stable connection or better. Wireless networks can cause reliability and performance issues.
State	**Online Testing Vendor**	**Basic Hardware Specs**	**Browser and Software Specs**	**Bandwidth and Connectivity**
Missouri	Riverside Publishing, (beginning with Summer 2011 - Questar Assessment, Inc.)	***Windows*** 98 or higher: Processor 233 MHz RAM 128 MB or higher ***Mac OS X*** 10.3.9 or higher, Processor PC G3, G4, or G5 processor or Intel-based, RAM 256 MB or higher 1024x768 screen resolution (17" monitor recommended)	***Windows:*** IE 5.5 or higher and EOC browser ***Mac OS X:*** Safari 1.3 or higher and EOC browser Flash 9 or higher.	High-speed internet connection

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Nebraska	Computerized Assessments & Learning and Data Recognition Corporation	***Windows*** 98, NT, ME, 2000, XP, 2003, Vista, 2008, 7 ***Mac OS X*** 10.3 (with Java 1.4)/10.4 and above Memory 64 MB of RAM (28 MB recommended); Display 800x800 pixels; Video adapters min 8 MB of memory; CPU/Processor: 200 MHz or higher ***Visual Accommodations:*** Memory 512 MB minimum (1 GB recommended); CPU/Processor: 1 GHz minimum (1.5 GHz recommended) ***LCS Requirements:*** ***Windows:*** 98, NT, ME, 2000, XP, 2003, Vista, 2008/7 ***Mac OS X*** 10.3. (with Java 1.4), 10.4, and above, Linux Processor 1.2 GHz; Memory: 512 MB (1 GB recommended); Disk Space min 512 MB of free space	LCS software Student tutorials require Flash version 7r63 or higher	LCS configuration can support up to 1500 simultaneous testers

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
North Carolina	North Carolina State University	***Windows, Mac, and Linux*** compatible. Screen resolution 1024x768	***Windows*** XP, Vista, and Windows 7: IE 7 or 8; Windows 7 IE 9; ***Windows, Mac OS X, and Linux*** Firefox 3.5 or newer; Safari 5 or newer; Chrome 11 or newer Adobe/Macromedia Flash 10 or better; JavaScript allowed; Cookies allowed; Content must not be cached	Wired or wireless, but wireless should have WEP (wired equivalent privacy). Bandwidth level required would permit the test over a dial up (28.8 kbps) line for a single student. Recommend 56kbps of bandwidth to accommodate both upstream and downstream traffic/participant. The downstream estimate footprint for simple questions is 40-50 Kb per question.

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Oklahoma	Pearson	***Windows*** EX (SP 3): Pentium III 733 MHz processor; 512 MB RAM; Windows Vista (SP 1): Pentium III 1 GHz processor; 1 GB RAM; Windows 7: Pentium III 1 GHz processor; 1 GB RAM ***Mac OS X*** 10.4: G3, G4, G5 500 MHz processor; 512 MB RAM; Mac OS X 10.5: Intel, G4, G5 867 MHz processor; 512 MB RAM; Mac OS X 10.6: Intel processor; 1 GB RAM ***Minimum requirements*** 500 MB available disk space; 1024x768 screen; resolution; Keyboard and mouse (or other pointing device) (For an optimal student experience, any computer that takes a noticeably long period of time (e.g., more than 10 sec) to start and run applications, even computers which meet the above requirements, should not be used for high-stakes computer-based testing, if possible.	***Windows*** EX (SP 3): IE 6.0 or higher; Firefox 2.0 or higher; Safari 3.0 or higher; Windows Vista: IE 7.0 or higher; Firefox 3.0; Safari 3.0 or higher ***Mac OS X*** 10.4: Safari 2.0 or higher; Firefox 2.0 or higher; Mac OS X 10.5: Safari 3.0 or higher; Firefox 3.0; Mac OS X 10.6: Safari 4.0; Firefox 3.0	Wired or wireless TCP/IP Recommendation: min 6 Kilobits/sec of network bandwidth end-to-end for each user

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Oregon	AIR	***Windows*** (2000, XP, Vista, 7): Pentium 233 MHz, 128 MB RAM; 52 MB hard drive ***Mac OS X*** (10.3-10.6): Intel x86 or PowerPC G3, G4, or G5 processor, 128 MB RAM, 200 MB hard drive ***Linux*** (Fedora Core 6 (K12LTSP 4.2+) and Ubuntu 9 and 10): Pentium II or AMD K6-III 233 MHz, 64 MB RAM; 52 MB hard drive ***Recommended*** 1.3 GHz processor, 2 GB RAM, 80 GB hard drive; Min screen size 11.6 inches (1024x768 resolution) Headphones; Printers (Test administrators can print assessment session info)	Student Testing: Secure browser that prevents access to other applications and copying or creating screenshots Other Applications, such as TA Training Site, Student Training Site, Online Reporting System: ***Windows 2000:*** Firefox 2.0-4.0; IE 6; Windows XP: Firefox 2.0-4.0, IE 6, 7, or 8; Windows Vista: Firefox 3.0-4.0, IE 7, 8, or 9; Windows 7: Firefox 3.0-4.0; IE 8 or 9 ***Mac OS X*** 10.3: Firefox 2.0-4.0; Mac OS X 10.4: Firefox 2.0-4.0, Safari 3; Mac OS 10.5: Firefox 3.0-4.0, Safari 3, 4, and 5; Mac OS 10.6: Firefox 3.6-4.0, Safari 4 and 5 ***Linux*** (Fedora Core 6 (K12LTSP 4.2+) and Ubuntu 9 or 10): Firefox 2.0-4.0 Recommended for All OS: Firefox 3.5-4.0	Wired or Wireless Average response time for the online assessment system to provide the next question to students is less than one-half second

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Rhode Island	Learning.com: TechLiteracy Assessment Nimble Assessment Systems (subsidiary of Measured Progress, Inc.) –NECAP Assessments	**TechLiteracy Assessment:** ***Windows, Mac OS X, or Linux*** 64 MB RAM; Speakers or headphones; Mouse; Screen Resolution 800x600 **Nimble:** ***Windows*** Intel Pentium 1.0 GHz or faster, 256 MB RAM, Windows 2000, SP4, XP SP2, Vista ***Mac OS X*** Power PC G3 1.0 GHz or faster or Intel Core Duo 1.83 GHz or faster, 256 MB Ram, Mac OS X 10.4.10 or 10.5 Headphones; Monitor	**TechLiteracy Assessment:** IE 7.0 or later; Firefox 3.0 or later; Safari 3.0 or later Adobe Flash Player v9.0 or later; Adobe Reader v7.0 or later **Nimble:** NimbleSecure	**TechLiteracy Assessment:** 56K modem or better Internet connection with adequate connectivity (64 kb/s per student) Generally, a school with a: - T1 connection will be able to have 24 simultaneous connections at 64kb/s each - T3 connection will be able to have 672 simultaneous connections at 64kb/s each ***Nimble:*** Recommended to use a wired system

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South Carolina	Computerized Assessments & Learning and Data Recognition Corporation	***Windows*** 98, NT, ME, 2000, XP, 2003, Vista, 2008/7 ***Mac OS X*** 10.3. (with Java 1.4), 10.4, and above Processor 200 MHz; Memory: 64 MB (128 MB recommended); screen resolution min 800x600 **LCS requirements:** ***Windows*** 98, NT, ME, 2000, XP, 2003, Vista, 2008/7 ***Mac OS X*** 10.3 (w/Java 1.4), 10.4, and above, Linux Processor 1.2 GHz; Memory 512 MB (1 GB recommended); Disk Space min 512 MB of free space	CAL Test Delivery System Optional Local Caching Software	Connectivity: Able to connect to the internet or to a local school server via http(s) on ports 80 and 443 LCS configuration installed in your environment can support up to 1500 simultaneous testers

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
South Dakota	Scantron Corp (Achievement Series)	***Windows*** 2000 or XP Pentium III 500MHz or higher; 256 MB RAM Flash Player 8.0.34 or higher ***Mac OS X*** 10.2 or higher 500 MHz or greater 63, G4 or G5 256 MB of RAM 800x600 min screen resolution	Restricted Mode Online Test from Achievement Series Microsoft IE is required if using a proxy server for Secure Client	
State	**Online Testing Vendor**	**Basic Hardware Specs**	**Browser and Software Specs**	**Bandwidth and Connectivity**
Tennessee	Pearson	***Windows*** XP, Vista, Windows 7 (32-bit compatibility mode): Pentium III 733 MHz (PIII/4) 1.3 GHz recommended), PIII 500 MHz (PIII 800 MHz recommended) (for TestNav only), 512 MB RAM ***Mac OS X*** 10.4 (Power PC and Intel), 10.5, or 10.6: G3 500 MHz (G4 800 MHz recommended), G4 500 MHz (G4 800 MHz recommended) (for TextNav only) Mouse/Pointing Device, Headphones/Speakers; Screen resolution 800x600 (1024 x 768 recommended)	Adobe Reader V7 or higher Adobe Flash Player V10 or higher Sun Java Virtual Machine (JRE) V1.5 through 1.6x	High-speed internet connection (DSL, T1, etc.)

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Texas	Pearson	***Windows*** Pentium III 733 MHz (PIII/IV 1.3 GHz recommended); Processor (for TestNav only) PIII 500 MHz (PIII 800 MHz recommended); 512 MB RAM ***Mac OS X*** G3 500 MHz (G4 MHz recommended); Processor (for TestNav only) G3 500 MHz (G4 800 MHz recommended); 512 MB RAM (1 GB RAM recommended) Min screen resolution 800x600 TAKS online testing (1024x768 for online study guides, management system, website, training, & TELPAS & End-of-Course tests) 16-bit sound card/speakers (not required for testing, for training only) Thin client and desktop virtualization environments are not supported for online testing.	***Windows*** XP (Up to SP3): IE 6.0, 7.0, or 8.0, Firefox 3.0; Windows Vista (32- or 64-bit) or Windows 7 (32- or 64-bit: IE 7.0, or 8.0, Firefox 3.0 ***Mac OS X*** 10.4 or higher: Safari 4.0 or Firefox 3.0 Adobe Reader V7.0 or higher; Adobe Flash Player V9.0 or higher Note: TestNav ver. 6 is an installed client application requiring internet connectivity to testing services. (current Texas online testing environment) TestNav ver. 7 is a browser based testing environment requiring internet connectivity to testing services. (under review for use in Texas)	Internet Connection: High-speed (DSL, T1, etc) TCP/IP Recommendation: min 6 Kilobits/sec of network bandwidth end-to-end for each user

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
Virginia	Pearson	***Windows*** EX (SP 3): Pentium III 733 MHz processor; 512 MB RAM; Windows Vista (SP 1): Pentium III 1 GHz processor; 1 GB RAM; Windows 7: Pentium III 1 GHz processor; 1 GB RAM ***Mac OS X*** 10.4: G3, G4, G5 500 MHz processor; 512 MB RAM; Mac OS X 10.5: Intel, G4, G5 867 MHz processor; 512 MB RAM; Mac OS X 10.6: Intel processor; 1 GB RAM ***Minimum requirements*** 500 MB available disk space; 1024x768 screen resolution; Keyboard and mouse (or other pointing device) (For an optimal student experience, any computer that takes a noticeably long period of time (e.g., more than 10 sec) to start and run applications, even computers which meet the above requirements, should not be used for high-stakes computer-based testing, if possible.	***Windows*** EX (SP 3): IE 6.0 or higher; Firefox 2.0 or higher; Safari 3.0 or higher; Windows Vista: IE 7.0 or higher; Firefox 3.0; Safari 3.0 or higher ***Mac OS X*** 10.4: Safari 2.0 or higher; Firefox 2.0 or higher; Mac OS X 10.5: Safari 3.0 or higher; Firefox 3.0; Mac OS X 10.6: Safari 4.0; Firefox 3.0	Wired or wireless TCP/IP Recommendation: min 6 Kilobits/sec of network bandwidth end-to-end for each user

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Washington	Computerized Assessments & Learning and Data Recognition Corporation	***Windows*** 98, NT, ME, 2000, XP, 2003, Vista, 2008, 7 ***Mac OS X*** 10.3 (with Java 1.4)/10.4 and above ***Linux*** Ubuntu 10.04 LTS w/Gnome Window Manager 2.3 Memory 64 MB of RAM (128 MB recommended); Processor200 MHz or higher; screen resolution 800x600; Sound card/Onboard sound; headphones/Speakers (demo only) **LCS Requirements:** ***Windows*** 98, NT, ME, 2000, XP, 2003, Vista, 2008/7 ***Mac OS X*** 10.3 (w/Java 1.4), 10.4, and above, Linux Processor 1.2 GHz; Memory 512 MB (1 GB recommended); Disk space min 512 MB of free space	Safari, IE, Firefox, Opera, Netscape, Chrome Adobe Acrobat Reader (demo only); Flash 9.0 or higher (demo only) Local Caching Software option for districts without adequate bandwidth	Reliable T1 connection can support 100-150 testers For planning purposes, a good estimate of an average test size is 200KB. If we assume a T1 internet connection (1.54 Mbps) for your school, and if you allow a 120 second window for all your students to login to the test, your capacity will be approximately 115 students simultaneously.

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
West Virginia	CTB/McGraw-Hill	**Acuity Min System Requirements (formative assessments)** ***Windows*** 2000, XP 500 MHz Pentium processor or higher ***Mac*** OS 10.3.9, 10.4.11, 10.5.6 PowerPC or Intel-based processor 128 MB of virtual memory; 128 MB (256 MB memory preferred); LAN connected (TCP/IP 10 MBps or faster; Mouse/pointer	**Acuity Min System Requirements (formative assessments)** Windows XP: IE 6.0 or 7,0; Firefox 3.0.5***;*** Windows 2000: IE 6.0; Firefox 1.5.0.12***;*** RealPlayer 6.0 10, or Windows Media Player 10 or 11***;*** Microsoft Excel V2003 or 2007***;*** Adobe Reader 8***;*** Adobe Flash Player 9.0 or 10 ***Mac:*** Safari 3.0.4 (Mac OS 10.5.6), Safari 1.3.2 (Mac OS 10.3.9), Firefox 2.x/Safari 3.0.4 (Mac OS 10.4.11) Icab 3.03 (Test taker-students); QuickTime 7.1.5 for sound files; Microsoft Excel 2004 or 2008; Adobe Reader 5.0, 7, 8.10, or 9; Adobe Flash Player 9.0 Cookies enabled; ActiveX enabled; AutoComplete set to "off"; Ability to allow pop-ups Ability to by-pass proxy in cases where proxy server does not perform adequately	

State	Online Testing Vendor	Basic Hardware Specs	Browser and Software Specs	Bandwidth and Connectivity
West Virginia Cont …		**Online Assessment System** ***Linux*** 1.0 GHz processor (1.3 GHz recommended) ***Mac OS X*** 10.4.8, OS 10.5.4 or OS 10.6 Intel***;*** 1.8 GHz Intel processor ***Windows*** 2000, Sp4, XP Sp3, Vista Sp1, Windows 7; 1.0 GHz processor (1.3 GHz recommended) 512 MB of memory; 200 MB disk space available (1 GB recommended); Screen resolution 800x600; min color display 256 colors (6-bit); Keyboard and Mouse	**Online Assessment System** **Windows** Adobe AIR; Java Runtime Environment (JRE5, Update 16) ***Mac OS X*** Safari 2.0 or Firefox 2.0 Flash Player 9	**Online Assessment System** Bandwidth: Min 1.5 Mbps upload and download – T1, high speed cable or high-speed DSL required for every 50-100 concurrent users Web Browser: Configured to be SSL capable (SSL 2.0 and SSL 3.0)