TechReadinessTool

Key Local Considerations

Regarding Using, Understanding and Interpreting Infrastructure Data & Readiness Indicators in the Technology Readiness Tool

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This is a living document and subject to periodic update. We recommend reviewing the document online rather than printing a hard copy.

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I. Introduction

This document is intended as a supplement to the *Technology Readiness Tool User's Guide*, and specifically addresses some of the considerations and/or local decisions that district and school staff may need to include in their transition planning or in their determinations of local readiness for the online delivery of statewide or other high-stakes assessments.

The information presented here is provided both as an aid to the collection and input of technical and infrastructure data for the TechReadiness Tool (TRT), and also as a guide for understanding some important limitations to the readiness indicators that the TRT can provide, especially given the broad variety of both types of infrastructures and also local schedule and student logistics management.

Caveats with Interpreting TRT Readiness Indicators

The design and structure of the TechReadiness Tool is intended for broad national use by thousands of individual school districts. Consequently, the TRT does not and cannot account for every possible technology or infrastructure configuration, or for every logistical or scheduling constraint that might exist for a particular school or district.

There are some cases in particular where additional local information or planning may be necessary before a definitive answer regarding overall readiness can be known, such as where devices may be shared across multiple schools (e.g., a bank of laptops, sometimes known as "computers on wheels," that are shuttled from one school to another during an assessment window), or where some computers or computer labs within a school can be used for testing longer within a testing window than other computers or computer labs.

To aid in the understanding of limitations such as these, this document calls out specific and important "caveats" that should be understood when reading and interpreting readiness results from the TRT. These are presented in the context of the specific situations and scenarios where the structure of TRT data collection or reporting may be more limited than the individual situations at the district and school level.

II. Devices for Assessment Delivery

The information in this section addresses considerations, situations, and important TRT interpretation caveats related to the devices (computers, tablets, thin clients, etc.) that may be intended for use at the local level in delivering online student assessments.

1. "Eligibility" of Devices for Readiness Determination

One of the first questions local staff may face is which of the school's devices should be included as eligible candidates for potential use with student assessments. This includes determining which devices should be loaded into the TechReadiness Tool, but is a question broader than the use of the TRT or any other individual tool or guide for assessing the technical readiness of a school for its transition to online testing.

For the purpose of determining readiness, it is typically useful to think of computers or other devices that are owned by the school or district as falling into two distinct categories:

1) Those devices that are or could be used by students for any instructional, assessment, or other purpose
2) Those devices that by the nature of the intended use, location, or assignment would be inappropriate to consider for student use

Devices that might fall into this second category could include (but are not limited to) computers that are for personal use by teachers, principals, other administrative staff, etc., or computers that are located in parts of the school building or district offices that are not generally accessible by students (such as computers located for use by IT, janitorial, cafeteria, bus maintenance, or other district personnel not involved in student instruction). Likewise, computers that are designated solely for network functioning, such as servers or file share computers, would fall into this second category.

None of the devices that fall into the category of inappropriate for student use should be considered as eligible for determining readiness for student assessment, and in most cases districts may find it easier to not even include these computers in any inventory or catalogue where the purpose is such. For the TRT, these computers do not even need to be loaded into the tool.

Some school personnel, however, may find that their most straight-forward path for loading devices into the TRT may utilize pre-existing inventories or lists of devices. Where these lists may not already be divided into the two categories specified above, school personnel have two options—they can either remove inappropriate devices from their inventory list prior to loading into the TRT, or they can instead load all devices in bulk, and subsequently mark those not appropriate as such by using the "Assessment Environment" field in device inventory management to indicate these devices are "inappropriate" for student use.

Marking devices this way will cause the TRT to consider them as not fully meeting the requirements for use with student assessments. Note that this technique will cause the overall percentage of "devices meeting requirements" to be lower than if the devices are left out of the TRT entirely. But either way, the same number of eligible devices (that is, those that do meet the requirements) will be used for determining device to test-taker readiness.

Local staff should be cautioned that any devices that have been loaded into the TRT that have **not** been marked as inappropriate will be included as eligible devices, as long as they also meet all other technical requirements as set by the Smarter Balanced or PARCC consortia. If there are any devices that have been loaded into the TRT that local staff determine should not be used for a high-stakes assessment (such as devices for which the age or generally poor performance should disqualify them), they can also be marked as "inappropriate" and thereby taken out of the pool of devices that can be used for an online student assessment.

2. "Appropriateness" of the Device Environment for Student Assessment

Even among the population of devices that may be appropriate for student use, there may still exist logistical or other factors that might suggest that a student-used device should be considered not eligible for specifically determining readiness for online assessments. The "Assessment Environment" field in the TRT is intended to allow local staff to exercise judgment regarding these other considerations, and this field can be used to remove devices from consideration for readiness for any reason that district or school building personnel deem to be relevant.

The local decision regarding whether to exclude student-used devices from readiness determination should consider many factors, including the need or required usage of the computers; the placement, quantity, and configuration of these computers; and also any environmental factors important for considering student assessment requirements in general.

For example, many classrooms may have computers located in the back of the classroom in ones, twos, or threes. These computers, while often intended for student use, might still be wholly inappropriate for student assessment use, especially if they could be used only while the rest of the classroom is engaged in general instruction or otherwise occupied in a manner that would create an environment inappropriate for students to take an assessment. Note, however, that this same configuration of computers might still be an appropriate location if the logistics and scheduling of an assessment allowed for the use of the classroom solely for testing—for instance, in a situation where the rest of the class might be re-located during student testing.

In other situations, local staff may find that some computer laboratory configurations are not able to be used for student assessment, perhaps as a result of a need (or even grant-driven purchasing requirements) to be solely dedicated to instructional or other purposes. Again, in such cases, the "Assessment Environment" field in the device inventory management can be used to mark these computers as "inappropriate" and remove them from readiness determination calculations.

Additionally, local staff should consider whether there are local, state, or other requirements regarding security of the environment, such as:

1) Whether instructional materials that might normally be available on the walls or elsewhere in the environment must be removed, covered up, or otherwise addressed
2) Whether the placement of computers or computer displays complies with local, state, or other regulations regarding general test security

3) Whether additional configuration aides, such as monitor screens, dividers, or other visual barriers, might need to be introduced into the environment to make the devices and their configuration appropriate for assessment
4) Which devices—especially laptops, netbooks, and tablets— are mobile and can be moved into locations or configurations that would be suitable for assessment use

In all of these circumstances, local staff should consider not just the devices themselves, but the entire environment and the overall suitability for student testing use when they consider whether or not particular devices are appropriate for assessment use and eligible for determining readiness.

3. Devices Shared Among Multiple Schools

There may be circumstances where the nature of location, use, or student logistics might not fit cleanly into the structure of the TRT for determining readiness. One such example is where computers may be shared by more than one school building— such as mobile laptop carts that can be moved from one school to another, or shared computer facilities to which students from more than one school can be transported.

The TRT has been designed to assess readiness for individual school buildings. In circumstances such as the above, local staff should carefully consider the very real logistical constraints that cross-school shared resources will present, prior to deciding with which building to associate the devices. Where resources are shared between multiple schools, and would need to be shared during any common assessment window, a first option for local staff would be to split the devices among the schools who share them (ensuring that no device is entered for more than one school).

Alternatively, in a situation where district staff knows for certain that student assessment use between multiple schools would never overlap and create potential resource contention, the local staff may elect to enter these devices as duplicates in multiple schools. However, local staff should exercise great caution with this approach. If a single computer is showing up in the TRT inventory more than once, there is the potential—especially in cases where scheduling logistics may change—for the TRT calculations to over-report readiness.

Local staff is advised to be especially conservative in shared resource circumstances. When any doubt about potential resource contention exists, it is a recommended practice to err on the side of under-reporting readiness by not duplicating devices in multiple schools, rather than potentially over-reporting the readiness of schools.

IMPORTANT CAVEAT for Interpreting TRT Results: TechReadiness Tool reports do not have any mechanism for knowing where cross-school duplication of devices may exist, and will always report readiness calculations as if each device associated with the school is unique to that school. If a school or district has duplicated any shared computer resources, this should always be done carefully, especially where scheduling logistics may need to change in response to other factors.

4. Thin Clients and Other Virtualization Solutions

Many different virtualization configurations exist that may prove challenging for schools to provide within the general structure of the TRT data layout for computers. Such configurations may include thin clients, “zero” clients, Virtual Desktop Infrastructures (VDI), Remote Desktop

Protocols (RDP), Virtual Network Computing (VNC), and even some hosted/SaaS solutions, whether they are hosted from within a school's network or are cloud-hosted solutions.

In all such cases, the computer or keyboards, mice, and monitors that the students use are not the same as the computer or computers that may be running the test delivery software. In fact, they may even be located far from each other (such as in the case of cloud-hosted virtualizations). For the purposes of entering these devices into the TRT, the technical configuration specifications for operating system and memory should correspond to the computer or server ***where the test delivery software will be running***, while the technical specifications for screen resolution, monitor/display size, and assessment environment should correspond to the relevant devices and location where the student will be. In addition, it is advised that local staff also indicate in the "Device Type" field that these devices are "thin client/VDI" devices.

IMPORTANT CAVEAT for Interpreting TRT Results: In the case of thin client or other virtualization configurations, it is important for local staff to be aware that the simple TRT determination of whether the device's technical specifications meet the consortia requirements may not be wholly sufficient to determine whether the virtualized configuration is fully prepared for the entire volume and type of testing that such solutions will be used for during an online assessment. In particular, given the breadth and variety of different virtualization technologies, several additional factors may need to be considered, including the type and number of devices running on any one server, the overall CPU, memory, and other technical specifications of the specific server, and whether the configuration as a whole may require other necessary components for successful delivery.

The TRT cannot assess any of these other parameters that may be specific to an individual school's virtualization solution or configuration. Local staff may need to create their own more detailed technical readiness evaluation of such solutions and configurations, and in particular' may want to consider enlisting the technical expertise and support of any personnel or contractors who may have been employed in the architecture or deployment of such solutions. Care should be taken in interpreting any TRT "ready" results that involve such configurations.

Additionally, local staff is advised to be cognizant of any specific security requirements or policies —local, state, or consortia-provided—with which these virtualized solutions may need to comply. In particular, some of these solutions can present a technical challenge of the test delivery software to control and lockdown the student "desktop experience" to prevent student multi-tasking and access to non-approved materials, resources, or communications during testing. Local staff is advised to carefully evaluate the key elements for providing a secure assessment experience with virtualization solutions to their students.

5. BYOD and Other Devices Not Owned and Managed by the School District

Bring Your Own Device (BYOD) programs may present special challenges to evaluating readiness. The TRT includes an additional field in the device layout for device inventory management that allows local staff to indicate that some devices may not be owned or managed by the school or district. This field is especially intended for situations such as with BYOD programs, or with virtual schools, where planned testing may intend to make use of student-owned devices.

However, in such cases, local staff should make sure that the information they provide to the TRT is sufficiently accurate and relevant in order to provide reliable and useful TRT reports. In particular, local staff is strongly cautioned against entering "placeholder" technical information for these devices, as it may not accurately represent the true device parameters.

IMPORTANT CAVEAT for Interpreting TRT Results: Where devices not owned and managed by school personnel are entered in to the TRT, the resulting readiness reports will provide information only as accurate as that provided in the device data. Where this data may be a less-than-accurate representation of the specific devices, the resulting report data will be likewise less than accurate.

Additionally, local staff is advised to pay very close attention to any specific security requirements or policies—local, state, or consortia-provided—with which these devices may need to comply. Local staff with devices that are not managed by the school is advised to carefully evaluate the key elements for providing a secure assessment experience to their students.

6. Other Device Requirements That May Apply

The TRT provides a general mechanism for examining the majority of critical technology specifications that devices may need to meet. But there can still be other requirements that local staff may need to be aware of, and in some cases separately evaluate, for the purposes of determining local readiness. These other requirements often may relate to specific kinds of devices, special assessment needs, certain kinds of tests, or other circumstances not common across all devices, assessments, and student needs.

Examples of additional and more specific requirements include:

1) Headphones for tests or students that require audio (such as for read-aloud provisions)
2) Physical keyboard and/or stylus requirements that may be relevant only for tablet computers
3) Installed software, such as specific browser versions, Java, text-to-speech engines or voices, and other software required for certain testing situations
4) Assistive technologies, whether hardware- or software-based, for students with special needs

Local staff is strongly encouraged to familiarize themselves with all of the requirements and other communications from the consortia. These can be found at:

- PARCC: http://www.parcconline.org/technology
- Smarter Balanced: www.smarterbalanced.org/technology

IMPORTANT CAVEAT for Interpreting TRT Results: The TRT device readiness indicators do not evaluate the more specific needs that may apply only to certain types of devices, certain specific tests, or certain unique student needs, such as for audio or other accommodations. Local staff should make sure to thoroughly evaluate any such needs as may be applicable given the needs of the individual school and its students. Where appropriate, local staff may need to create their own more detailed technical readiness evaluation for these more specific situations.

III. Network Infrastructure for Assessment Delivery

The information in this section addresses considerations, situations, and important TRT interpretation caveats related to the district's or school's network infrastructure, and the measurement of its readiness for delivery of online student assessments.

School network configurations can be extremely variable from site to site, and the TRT has provided a very general method of determining network readiness based on evaluating the volume of testing required within a specified window, the consortia's reported minimum bandwidth requirements per test, and the school's available Internet and internal network capacity. The TRT network readiness calculations are necessarily broad, and depending on the actual complexity of the schools networking environment, may be far more complex for certain situations. The following section addresses a number of those situations where additional complexity may require additional considerations and even potentially more detailed local readiness planning, as well as some important caveats for understanding and interpreting the network readiness results reported by the TRT in such situations.

1. Determining a School's Connection Speed and/or Utilization

The most critical sets of data for determining a school building's available Internet and internal network capacity for the data traffic of an online student assessment are the connection speeds for both the school's Internet gateway and its internal network, and the general or expected utilization of both during the assessment. The connection speed is typically determined by the slowest switch or other hardware in the network path. Utilization, on the other hand, is a general measure of the amount of data traffic or "data congestion" within a network. Even a network with extremely fast connection speeds can deliver poor performance when it is close to 100% utilization, just as the largest freeway can still experience traffic congestion under certain conditions.

Connection speed and utilization may not be readily known or accessible by some of the local staff working to input their school building's data for the TRT, especially in cases where the personnel collecting and providing the TRT data may not be the same IT or other technical personnel who configure and maintain the network and Internet connections and traffic.

In these cases, it is recommended that school personnel collaborate with those, either within or external to the district, who can best answer questions about connection speeds and utilization. To maximize the reliability of TRT network readiness results, it is important that these data elements be as accurately represented as possible.

Caution is advised in attempting to use "speed tests" for obtaining data for the TRT, because most speed tests, especially those which assess the entire pathway from student computer to an Internet server outside the district network, will return a performance value that combines all four TRT factors (Internet bandwidth, internal network bandwidth, and the utilization of both) into a single value. While this can be a very accurate measure of the real performance available at any

point in time, it may not provide data in the form the TRT needs in order to report on the readiness for a school across the entire window during which student testing will occur.

Following are several examples of some of the kinds of tools that may be available to assist in determining connection speeds and utilizations. Please note that neither the consortia nor the TechReadiness tool endorse any of these specific tools, and there are many other tools that may be equally or better suited for the specific needs and purposes of a particular district or school building. Local staff may assess for themselves the best or most appropriate tools for helping to determine connection speeds and utilization percentages.

For local staff not able to find or obtain reliable **connection speed** information, especially for their internal network speeds, there are several tools available through downloads to help measure network performance and real connection speeds. Examples include:

- RaccoonWorks SpeedTest 2.0: http://www.raccoonworks.com
- PassMark's Advanced Networking Test: http://www.passmark.com/products/pt.htm

  NOTE: These applications require downloads to at least two internal computers or devices on your network. Computations for communication speed need to occur between the two devices within your internal network to correctly gauge the network performance and connection speed between them. It should be remembered, however, that as with any speed test, other network traffic or activity (network utilization) may affect the results of the test.

Other tools are available to help monitor and report on **network utilization.** Examples include:

- ManageEngine: http://www.manageengine.com/products/oputils/bandwidth-monitoring.html
- PRTG Network Monitor: http://www.paessler.com/bandwidth_utilization
- Spiceworks: http://www.spiceworks.com/free-network-monitoring-management-software/

Some tools available for bandwidth and utilization monitoring can also be employed in the management of network traffic, sometimes referred to as "traffic shaping." Local staff is advised to review pertinent local, district, or state policies and requirements regarding bandwidth usage, monitoring, and management before making use of tools to determine potential use of bandwidth.

2. Schools With More Than One Network Configuration

Some schools may find that one of the challenges associated with providing TRT network data, or with assessing overall network readiness in general, involves their use of more than one network topology or connection type, each with its own different minimum connection speeds, utilizations, and other critical network parameters.

A truly complete and comprehensive network readiness evaluation would need to look at every single device and its own unique traffic pathway across the internal network and Internet gateway. For the TRT to assess network readiness at this level of detail would require local staff to specify a vast and complex amount of information, such as which students of which grades would take which tests on which devices, and what the one or several connection pathways are for each of those devices. This can be especially varied where mobile and wireless devices are

employed. But providing this level of detail, obviously, would place such a heavy burden of extensive data collection on schools and districts as to be impractical from a data collection perspective.

Additionally, for some schools, utilization can vary over time, sometimes significantly so. Utilization is the amount to which a network's data pathways are already "full" of data traffic from non-assessment-related usages (such as instructional or administrative use of the district's network and Internet connection).

So the precise network readiness that the TRT can report is fundamentally constrained by both the network structure and the amount of detailed network metrics and other information that is available at the school level. That means that all network readiness indicators should be understood as a rough approximation of readiness, rather than an absolute guarantee.

In particular, when school buildings have more than one network in place—such as any combination of hardwired networks, wireless networks, and/or cellular (3G/4G) connections—local staff may need to carefully approach how they represent that data in the forced simplicity of the TRT data structure. One conservative approach would be to take the most traffic-constrained speeds and/or utilizations of any of the different networks and provide that to the TRT as representative of the school's networking information.

Another reliable method – especially for situations where the most constrained may represent only a small fraction of student connections – is to choose values for internet and internal network bandwidth and utilization that best represent the average or majority of testing conditions for most test takers' network connections. The reported results of network readiness should be reviewed and evaluated by local decision makers to determine what mitigating activities, if any, are necessary to ensure that sufficient bandwidth throughput is available to accommodate online testing during the test window.

IMPORTANT CAVEAT for Interpreting TRT Results: TRT readiness results may need special local consideration in cases where either (1) connection speed or utilization data was either estimated or otherwise arrived at without precise or consistent data regarding real network conditions, or (2) more than one network or set of connection speeds is in place within a single school. In these situations, local staff is advised to carefully consider how their data input might return either over- or under-estimated readiness values. Local staff may need to create their own more detailed network readiness evaluation given their specific network topology and configuration, and in particular may want to consider enlisting the technical expertise and support of any personnel or contractors who are or were employed in the architecture and deployment of their network.

3. Wireless Access Considerations

Wireless networks also warrant additional considerations when attempting to assess overall readiness for the data traffic associated with online assessments. True wireless network connection speeds can vary tremendously based on several additional factors. For instance, most wireless access points have an optimal or maximum number of device connections, and exceeding this number—by, for instance, moving a large number of mobile devices into an area that isn't supported by enough access points—can result in degraded performance that does not match the rated capabilities.

Additionally, the wireless connection speed depends on the connection protocols of both the access point and the device connecting to it. Some wireless networks may contain a mix of different wireless protocols (such as 802.11a, 802.11b, 802.11g, 802.11n, and others), especially where wireless devices of different ages and types exist, or in school buildings where newer access points have been added to previously existing and older access points. In situations like this, different devices may be connecting at different speeds depending on factors such as their age and their location within the building. And as described in the previous section, when multiple different connection speeds exist in the school building's network, the TRT results can only be a "best approximation" of the network readiness, based on the network connection data local staff have entered.

Lastly, the signal strength of a wireless connection can vary (in some cases, greatly) depending on external factors in the building that may interfere with the signal, including type and placement of pipes and support studs, the construction material of walls (such as concrete, brick, or drywall), and even the contents of the rooms the signal must travel through. No two locations are the same, and sites that appear to be similar could actually have measurably different wireless signal coverage within them.

Local staff should be aware that Bluetooth connected peripherals (e.g. wireless keyboards and mice) can interfere with Wi-Fi networks that are operating in the shared 2.4 GHz band. While there are methods for achieving successful coexistence, the most effective method, if feasible, is to migrate the Wi-Fi network to the 5 GHz band. However, be aware that the 5 GHz band has a shorter range than the 2.4 GHz band, and so additional access points may be required. Another option is to use wired keyboards for table devices to avoid wireless interference.

Additionally, wireless networks should be set up with security encryption and other security measures as appropriate. General security provisions should include protection against unauthorized access to the network; prevention of ad-hoc networks or connections to rogue access points; and barriers to network injection, MAC spoofing, or other potential intrusions. Student assessment data (both assessment content as well as student responses) may carry additional security needs. Local staff is advised to pay very close attention to specific security requirements or policies—local, state, or consortia-provided—with which wireless networks may need to comply, and to carefully evaluate the key elements for appropriately securing both test content and student response data.

IMPORTANT CAVEAT for Interpreting TRT Results: TRT network readiness results for buildings that employ wireless networks should be understood to be only high-level approximations, and local staff should expect that real network performance may depend on factors not able to be included in the general TRT network assessment. Local staff may need to create their own more detailed network readiness evaluation given their specific wireless network topology and configuration, and in particular may want to consider using techniques such as radio frequency (RF) site surveys or enlisting the technical expertise and support of any personnel or contractors who are or were employed in the architecture and deployment of their wireless network.

4. Network Considerations for Thin Clients & Other Virtualization Solutions

Device-specific considerations for thin clients and other virtualization components have been considered in Section II. However, there are network infrastructure considerations that also may impact readiness for online assessments. One critical security element that should be in place in any virtualized networking solution is the encryption of data streams from server to client or terminal device. Online assessment data—both content as well as student responses—will typically be encrypted for the entire communication pathway between the hosting location for the tests and the computer that is running the test delivery software.

However, in virtualized computing, there is effectively a secondary network topology representing the pathway between the virtualized server instance (the computer on which the test delivery software is actually running) and the client or terminal device (the computer or monitor on which the student is viewing and interacting with the test content). If this secondary communication pathway is not re-encrypted, the test content and student responses may be exposed and vulnerable to unauthorized access and capture. This is especially true for any solution where content is hosted “in the cloud” or where the communication pathway back to the students’ devices may traverse non-secured public Internet pathways.

Local staff is advised to pay very close attention to specific security requirements or policies—local, state, or consortia-provided—with which these virtualized solutions may need to comply. Local staff is advised to evaluate the key elements for appropriately securing both test content and student response data with virtualization solutions.

IMPORTANT CAVEAT for Interpreting TRT Results: Additionally, the secondary network topology represented by the pathway between server and client or terminal represents yet another network configuration for which the TRT data structure cannot fully measure readiness. For much the same reasoning as with any other multitude of different network connections and topologies within a single school building, any TRT network readiness results should be understood as an approximation of the overall suite of different network configurations, and as such, only as precise as the data decisions local staff have made in determining which values to input.

IV. Local Planning for Online Assessments

The information in this section addresses some of the key elements of planning that schools and districts may want to consider both as they first set some of the data input values for the TRT school survey questions, and also as they later look at and interpret the results shown in the TRT reports with respect to readiness indicators and gap analysis.

1. Schools & Other Organizations Without Student Enrollment Counts

The two testing-volume readiness reports – Device to Test-Taker Indicators and Network Indicators – are designed to calculate the capacity of the school's device and network infrastructure with respect to the number of test-takers and the number of tests that the school will deliver.

However, there may be some instances where a school or other testing location does not have any enrollment counts. In some cases, the organization may be a testing center or other location that does not have a permanent student enrollment, but instead exists as a temporary location for students who may need to test there under special circumstances – examples may include juvenile justice centers, alternative education centers, and designated testing locations for virtual schools or other students who may not be able to test at their usual education facility.

In other cases, schools may have enrollment counts to report, but they are in grades that will not be testing, such as in the case of preschool or early education schools that may not have any students beyond the second grade.

The number of students who will be taking the test is one very important element in determining readiness for online assessments. For the TRT, the consortia minimum requirements include specifications by grade, and in the case of some grades (such as for K–2), the consortia requirements currently specify no testing.

For schools that do not have or anticipate having any students in the grades that will be testing, the readiness assessment is fundamentally not applicable – these are schools at which no testing will occur, and for which the question of readiness is basically not relevant. For schools in the TRT that have reported enrollment counts, but not for any grades the consortia requirements specify as testing, the reports that rely on enrollment counts will show these schools as "not applicable." If school and district staff prefers not to include such schools in any of the aggregated district or statewide readiness results, they should mark these schools as "inactive" in the "Edit Organizations" screen. Marking any organization as inactive will cause it to be removed from all TRT reporting.

For any organization that does anticipate having student testing, but for whom no permanent enrollments exist, it is recommended that staff representing these schools enter an enrollment representing the highest number of students who might test within any window. In this way, the readiness results reported back by the TRT can be used to represent a "worst–case" scenario from a readiness perspective. When preparing readiness and transition plans, however, staff should always bear in mind that the enrollments, and the resulting readiness results, for these particular organizations are estimates only.

2. Determining or Planning the Length of the Testing Window

One of the more important planning variables that district and local staff will need to provide for their readiness assessment is the anticipated length of the testing window – the total number of days that students at each school will have to take the online test. Testing windows are typically employed as a means of relief for schools who may not have either sufficient bandwidth or a sufficient number of devices to allow all students at the school to test at the same time.

Most schools will find that their total capacity for simultaneous testing is limited by either the number of devices or by their bandwidth, and the TRT results can be used to "reverse calculate" which is the more limited factor. However, the reports are designed to report readiness as a percent of total capacity (based on student enrollment and the average number of test starts or sessions that each consortia has specified), so the question of which constraint is greater – devices or bandwidth – may not be immediately obvious.

To facilitate the additional planning district and local schools may need in order to properly determine the length of the window they may need, the consortia have provided additional planning guidance and tools.

The PARCC "Assessment Administration Guidance" (found at: http://www.parcconline.org/assessment-administration-guidance) provides additional information and "rules of thumb," as well as a spreadsheet-based PARCC Assessment Administration Capacity Planning Tool, to help district and school leaders identify possible gaps in assessment administration capacity, and to explore possible scenarios for addressing those gaps.

Smarter Balanced has made available to its members a "Smarter Balanced Bandwidth Checker" (found at: www.smarterbalanced.org/technology), that allows users to specify an expected number of students who will be testing at the same time for a specific Smarter Balanced test (either mathematics or English language arts), and the tool will provide information on whether the requested number of students should be able to test, given the current load on the school's network and Internet gateway. Also, a Web-based calculator is available to help schools estimate the number of days and associated network bandwidth required to complete the assessments given the number of students, number of computers, and number of hours per day computers are available for testing at the school.

District and local staff should also bear in mind that each consortium has specified a maximum number of days for the testing window. This value can be viewed from any report that has the "Minimum / Recommended Requirements 🔍" link. The TRT will not report readiness results for any window length greater than what the consortia have specified as the maximum. Should a school enter in a testing window value greater than that specified by the consortia, the TRT reports will provide results using only the maximum length set by the consortia (and this will be indicated by the text "(Consortium)" following the test window length value).

IMPORTANT CAVEAT for Interpreting TRT Results: The TRT calculations necessarily assume that all devices and all bandwidth metrics are the same throughout the entire testing window specified. If that is not the case—such as where one lab of computers may be available only for a single week, while all other devices at the school are available for a longer testing window— then schools should decide whether to enter a value (and interpret TRT) results based on either the shorter or the longer calendar constraint. The more conservative course would be to always use

the shortest calendar constraint; however, schools may also prefer to set the window length based on which constraint will govern the majority of student testing. In either case, care should be taken in interpreting the TRT results accordingly.

3. Session Planning and Re-use of Devices in a Single Day

Another key planning variable for local staff to consider for devices is the ability to reuse the same devices with one or more students in a single school day. This variable is represented in the TRT as “Sessions per Day,” and is part of the calculation used to report Device to Test-Taker Indicators.

This variable may be especially important for schools that must work with extremely low device counts as a constraint—by planning to re-use the computers a second or even third time within a single day, schools may further maximize their use of these resources in order to test all of their students within a smaller testing window.

However, local staff is advised to be cautious in the use of this variable. If a number is entered here that is higher than will be feasible or practical with respect to rotating students or sessions within a single day, the TRT Device to Test-Takers indicators will report a readiness metric that is higher—that is, more ready—than may be true for that particular school.