North Carolina Department of Public Instruction

Summary Information Technology Plan

For the 2012 – 2014 Biennium

By

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Transmittal Letter

April 12, 2013

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RE: Submission of Updated NCDPI Summary Biennial IT Plan

I am pleased to submit the updated 2012 – 2014 Summary Biennial IT Plan for the North Carolina Department of Public Instruction (NCDPI). As required by State Statute, the original plan was submitted in October 2012, and as explained in that document, the plan would be updated as additional information became available, especially for projects that were in the planning stages.

The primary focus of the NCDPI Technology Services over the next 6- to 18-month period is the continued development and implementation of applications and services needed to fulfill the technical provisions of the Race to the Top (RttT) federal grant received in late 2010. This mammoth effort - $140 million ($70 million state and $70 million LEA) of the total $400 million total grant - involves a multitude of technology projects, initiatives, and work efforts - all directed to enhancing classroom instruction and improving student performance and educational outcomes.

This Updated Summary Plan provides an overview of each project, describes how the various efforts are connected, and explains the overall governance and management processes. The Plan also shows the linkage between the IT endeavors and the major education and business objectives and strategies of the General Assembly, NCDPI, and the State Board of Education.

Sincerely,

Philip W. Price

PWP/tm

c: Michael Fenton, IS

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I. Summary Plan Highlights

Economists generally agree that a well-educated and highly trained workforce is essential for increased employment in higher- paying jobs that provide greater earnings and more household wealth. Therefore, public education is a key driver for the economic growth that fuels the sustained prosperity and well-being of the state's citizens. North Carolina received the federal Race to the Top (RttT) grant in 2010. RttT is a major, far-sighted endeavor for improving the performance of the state public schools, including reducing dropouts and better preparing students for vocational jobs and higher education. Moreover, as teachers are recognized as the most important school-based resources affecting student achievement, RttT focuses on applying the power of technology to enable and support innovative and effective classroom instruction.

The development and implementation of the technology components of RttT are the pervasive theme of the 2012-2014 North Carolina Department of Public Instruction (NCDPI) IT Plan. RttT has the potential to re-invent classroom instruction in the state public schools, thereby leading to significant leaps in student performance and education outcomes. However, due to its broad scope of influence and powerful capabilities, its implementation will be disruptive to school operations, particularly at the onset. There are significant technical and instructional learning curve challenges, but the probable return on investment is high. Of RttT's $400 million grant funds, $140 million ($70 million state and $70 million LEA) are dedicated toward instructional technology.

RttT involves numerous projects directed to the implementation of applications and technical services. Many of these projects are new, and some others are devoted to the replacement or restructuring of older (legacy) technologies. These closely coordinated and mutually dependent endeavors are grouped into three major categories listed below.

1. **Home Base** – Major applications comprising RttT:

   - PowerSchool (student information and school administration, State funded).
   - Instructional Improvement System (IIS) – classroom focus.
     - Core - curriculum, instruction tools, collaboration, course management, and student assessment – (Schoolnet, OpenClass, and Test Nav).
     - Educator Evaluation (Truenorthlogic) and Education Value Added Assessment System (SAS EVAAS, State Funded).
     - Professional Development (Truenorthlogic).

- Identity and Access Management (IAM).

- Learning Objects Repository (LOR).

2. **Key RttT Supporting Applications** – Technical services for RttT and cloud applications and services addressing LEA needs:
   - Data Integration (DI).
   - NCIS Enterprise Service Bus (ESB).
   - Cloud Projects (6) – directed to LEA improvements.
3. **NCDPI Applications and Initiatives Directly Related to RttT** – Activities focused on NCDPI for enabling RttT and improving internal operations:
   - Student and Staff Unique Identifier (UID).
   - Statewide Consolidated Reporting Tools and Data Dictionary and Absorption of Legacy Adjunct NCDPI Applications (Called Clusters) into PowerSchool.
   - Restructuring of NCDPI help desk to Support Center.

As with any technology undertaking of this size and complexity, RttT is fraught with uncertainty, risks, and organizational challenges. While the State Board of Education (SBE) and the State Superintendent of Public Instruction have overall responsibility for RttT, the governance structure of RttT places the obligation for its strategy setting, overall planning, and executive-level decision making in a five-member RttT Technical Leadership Team. The qualities of the people on the team include broad-based management experiences and skills. Moreover, each member possesses a specific educational, business, finance, or technical background, thereby presenting a diversified group of competencies.

The NCDPI CFO/CIO (a member of the RttT Technical Leadership Team) has been designated the point person for the successful delivery of the components of RttT. Accordingly, key project managers report to him, and he is responsible for ensuring essential business and technical issues and decisions are coordinated within the Team. He has implemented governance processes and practices to fulfill this responsibility.

The provisions of this plan align with an overall education goal of NCDPI and the State Board of Education (SBE) that states "All students must graduate and be career, college, and citizenship ready." The expressed IT strategy follows a series of nested education programs and initiatives, such as Remodeling Public Education, READY, and RttT. These instructional strategies address wide-ranging reforms to remodel K-12 public education in this state. These modifications overlap with goals of RttT in areas such as:

- High student performance standards and accountability for education program outcomes.
- Nationally comparable student assessments.
- Technology-enabled classrooms.
- Rigorous educator evaluations.

The above transformations focus on closing gaps in learning among student socioeconomic classes and demographic groups, reducing dropouts, and improving overall student academic achievement. The specific technology components of RttT exist to provide a broad-based technical infrastructure for assisting public schools in meeting these objectives. Major components include:

- Digital instructional tools.
- Administrative, business, and financial applications.
- Databases for enabling statistical and analytical reporting.
- Supporting technical services for facilitating data transfer and ensuring security.

Many public and private sector organizations and groups interested in K-12 public education and technology are participating in the RttT directly or in advisory roles. Two more prominent participants outside of NCDPI are the Friday Institute for Education Innovation (FI) at North Carolina State University and the State Chief Information Officer (State CIO) and his Information Services (IS) organization.

In conclusion, by deploying up-to-date and emerging technologies through the implementation of RttT, renovating and restructuring outdated and ineffective legacy applications, and reforming the organization and management of data resources, the approximately 30 projects of the IT Plan will meet the following objectives:

- Revitalize K-12 public education through innovative instructional methods and practices to improve student outcomes and educational program performance.
- Simplify instructional and administrative activities for school- and LEA-based personnel to increase productivity and work effectiveness.
- Consolidate and standardize NCDPI's disparate mix of single-purpose legacy applications that presently use a variety of technical infrastructures. By reducing the number of applications and sharing common underlying technologies, this effort will offer greater reliability, enhanced security, better data accuracy and integrity, and more functionality at lower cost.
- Collect, organize, analyze, and report data to provide information useful for decision making, allow for better management, and increase accountability.

NCDPI will accomplish these objectives by bringing together the best of its staff, employing experienced and proven vendors, developing comprehensive plans, overseeing progress rigorously, and aiming for big classroom benefits – all on a tight timetable.

II. Summary Plan

A. State Public Schools' Goals and Strategies and Enabling IT Initiatives and Resources – How the plan meets instructional and administrative needs?

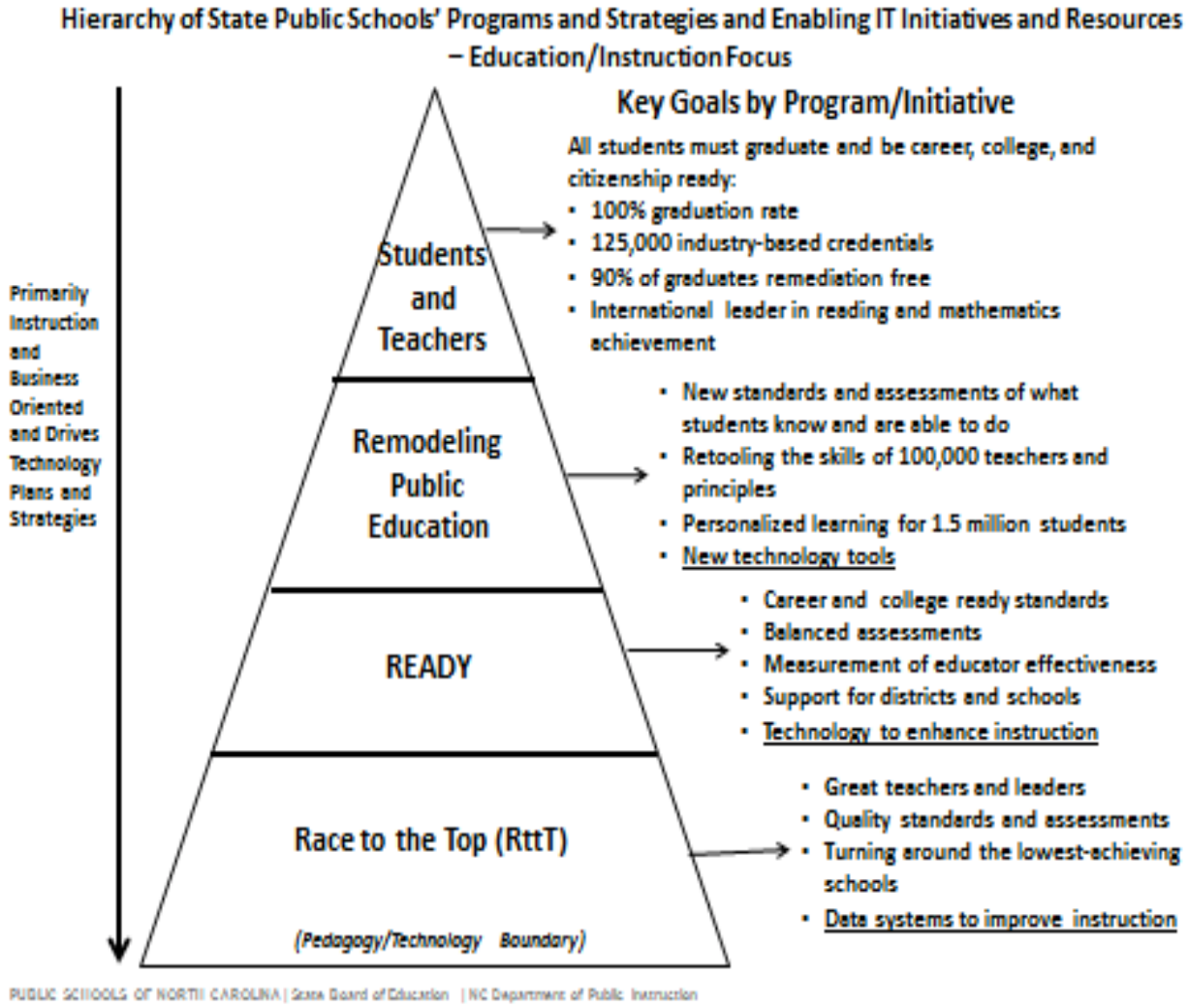
In late 2010, North Carolina capitalized on its vision for major educational reform to win a $400 million Race to the Top (RttT) grant from the US Department of Education. About $140 million ($70 million State and $70 million LEA) of the grant's $400 million is dedicated to developing and implementing technology initiatives that are targeted to classroom instruction. All initial efforts of Home Base RttT work must be completed by early summer 2013 and other RttT work by August 2014.

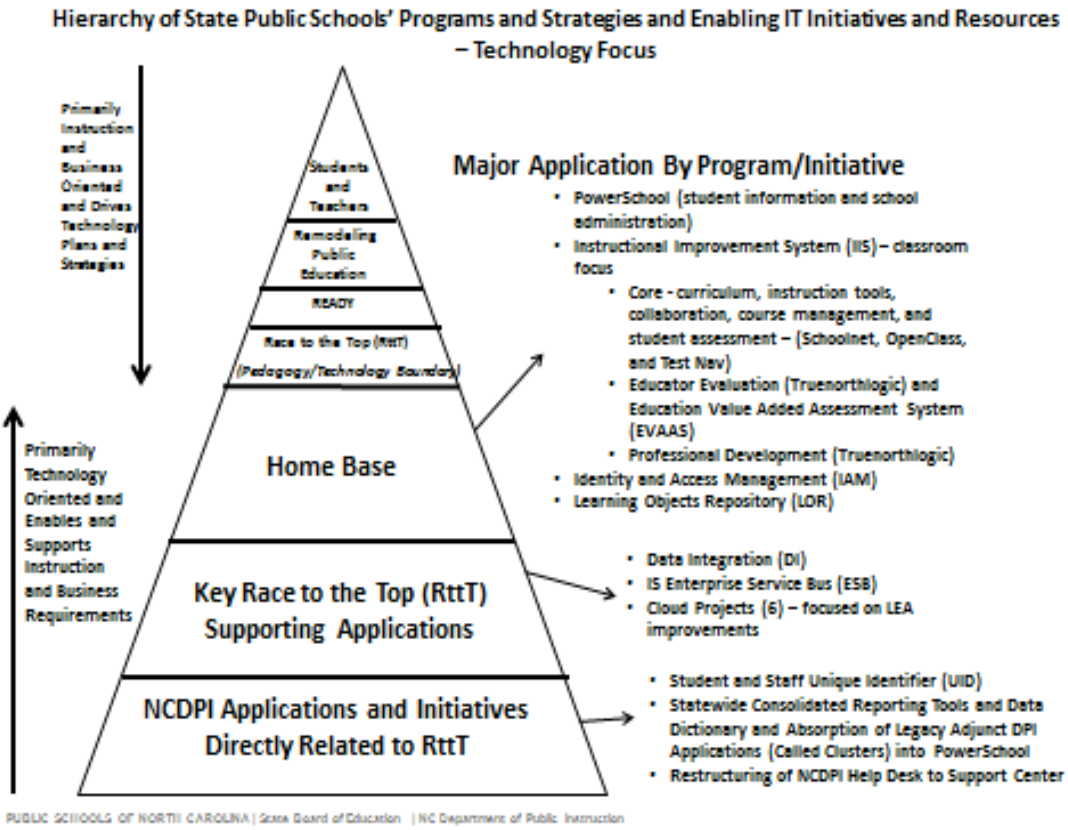
RttT offers a one-of-a-kind combined instructional and administrative system for the State's public schools. While the administration-focused applications have been employed in public and private education for many years, the instruction-based and classroom-targeted applications are recent additions to the school environment. As this plan is implemented, North Carolina will be the only state to successfully combine both varieties of applications into one product, offering a single view to the education community.

The following two pyramid diagrams illustrate the relations among the education programs and technical components of RttT. Two points are pertinent: One, the first pyramid shows that RttT does not exist as a separate individual-purpose endeavor, but is congruent with a number of educational programs and initiatives dedicated to shared objectives and constant purposes. Two, the second pyramid illustrates the technical components are not stand alone entities demonstrating the application of technology for its own sake. Rather, they are the result of carefully developed instructional and administrative goals and strategies combined with meticulously crafted supporting technology plans and investments.

While the top portion of the second pyramid summarizes the educational and administrative strategies, the lower half lists the major enabling and supporting technology initiatives. The education and technical components of the pyramids are synchronized, closely coupled, and complimentary. The most important theme of this pyramid is instructional programs and enabling technologies together form a comprehensive and coherent strategy targeted to the classroom and concentrated on teachers and students. The sole purposes are to improve

student performance and education outcomes. The overriding goal is all students must graduate and be career, college, and citizenship ready.





B. Overview of Major Initiatives and Projects – What is in the plan?

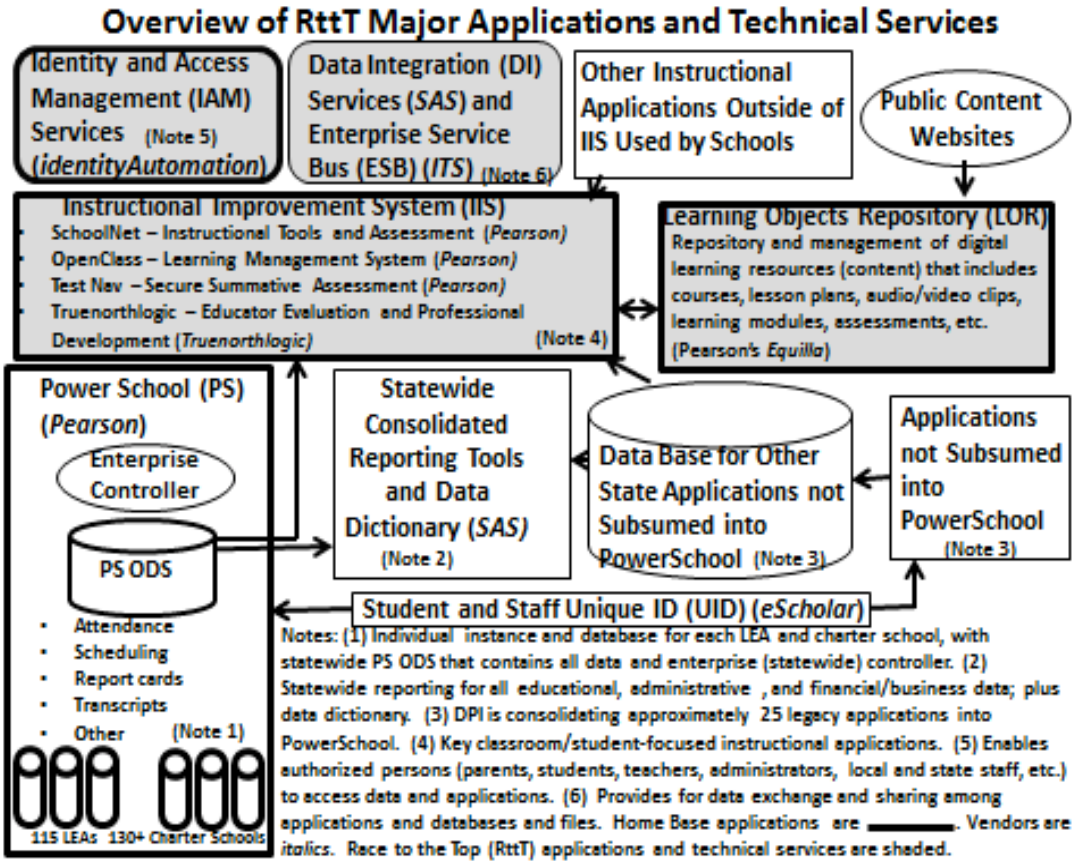
RttT provides for a comprehensive and modern technology platform supporting classroom instruction and serving teachers, school administrators, students, and parents. When fully implemented, RttT-funded projects will offer vastly improved technical resources that promise to revolutionize the way teachers deliver instruction in the classroom.

The remainder of this section of the NCDPI IT plan is organized in five groups by category of projects:

1. Home Base (eight applications).
2. Key RttT supporting applications (three applications).
3. NCDPI applications and initiatives directly related to RttT (three applications).
4. Projects important to the management and operations of the state public schools, but unrelated to RttT (six projects).
5. Endeavors related to internal improvements at NCDPI (two endeavors).

The diagram below highlights the major projects and technical services composing and supporting RttT and described in the first three groups above. The shaded items are RttT

oriented, the bold outline endeavors comprise Home Base entities, and the remainders are supporting elements.

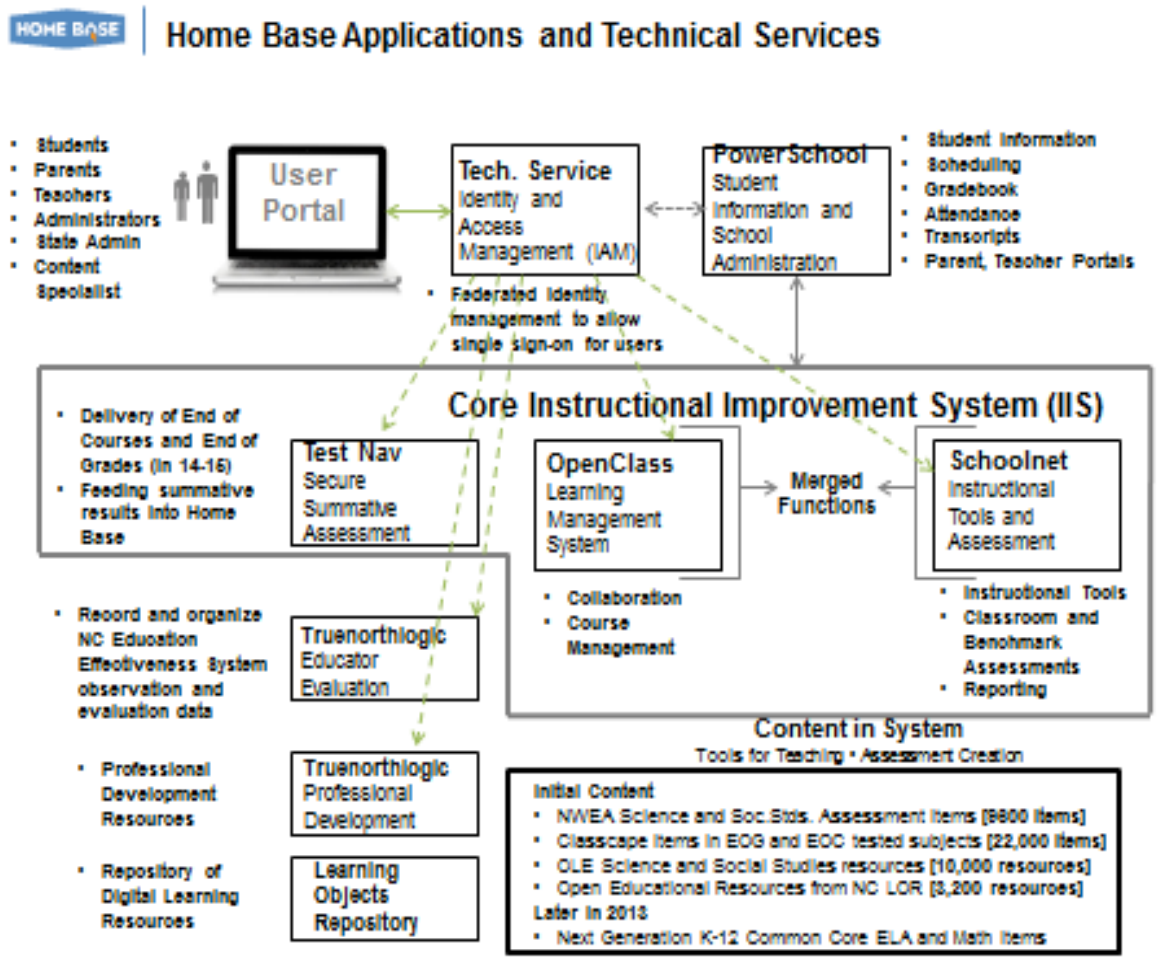


Three points regarding the above applications and technical components are pertinent. First, although each of the individual applications and technical components of RttT offers benefits, the real usefulness and true value comes from the composite package. Second, although PowerSchool and the applications under Instructional Improvement System (IIS) are the primary user facing applications, Identity and Access Management (IAM) and Data Integration (DI) services serve as glue that connects these key applications to related systems, data, and services. Third, all components of RttT are interconnected and interdependent; therefore, a degrading or failure of any one will adversely impact the others. The last point is especially relevant for PowerSchool and IIS, as they share many items (such as portals, rosters, grade books, etc.), and the former is the primary supplier of data to the latter.

In summary, RttT offers a powerful configuration of state-of-the-art instructional and administrative technology, with potential learning tools and student achievement benefits never before envisioned in NC public schools. However, the implementation and operational work efforts are substantial, and the associated risks are formidable.

1. Eight Home Base Applications

The diagram below highlights the eight key Home Base applications and their key relations.



Home Base

Home Base is the encompassing name of the eight applications pictured above and summarized below. These applications compose an integrated whole with a single view to the authorized participants in the state public schools, including teachers, students, administers, and parents. The name signifies that all participants have a common starting point for accessing and using the integrated applications as a single (one-view) system. With the implementation of Home Base, information technology will be embedded in every significant education program, key instructional activity, and major administrative process on a statewide scale. By its high level of integration, composite view to the user, broad coverage of both administrative and instructional areas, and statewide implementation scope, it is a first-of-its-kind in the nation.

The guiding principles for the implementation of Home Base are:

- The overall intent is to assist teachers, administrators, and parents to enhance student achievement and improve learning outcomes.
- To the greatest possible extent, all school level operations and data collection and validation will be incorporated in PowerSchool.
- LEAs and charter schools will be allowed maximum flexibility, thereby employing the applications to meet local desires.
- Data accuracy, completeness, and quality will be improved.
- Accessibility of data and reporting will be simplified, more useful, and easier for LEAs and schools.
- Integrity of processing, privacy of individuals, and confidentiality of information will be maintained.

PowerSchool - Student Information System (SIS) – The SIS functions as the primary administrative system for NC public schools. The system records all student information necessary for local school operation as well as for state and federal reporting. The present SIS (called NC WISE) is almost 15-years old and is functionally deficient, technically obsolete, and out of support from the vendor. PowerSchool (PS) will be the replacement software for NC WISE. PowerSchool will offer greater functionality and usability than its predecessor. The new system's features and data collection and validation capabilities are prerequisites for the successful implementation of IIS.

PowerSchool includes: parent and student portals; student ID data; attendance/rosters; online course registration and class scheduling; student homework assignments; grade books, report cards, and transcripts; health records and medical contacts; demographics; athletic eligibility; discipline management; email exchange among teachers, parents, and students; data analysis and reporting; etc. In essence, this application contains all the functionality and data for education personnel to manage a school and to work with parents and students for achieving the best possible educational outcomes.

Since it supplies extensive data to IIS and shares its grade book, parent and student portals, and other items with that application, PowerSchool is prerequisite for the implementation of IIS. Therefore, it must be available by July 2013 for the 2013-2014 school year. Due to the complexity and rigidity of school calendars and the need for consolidated statewide and federal reporting, the transition from NC WISE to PowerSchool cannot be accomplished in phases. The

transition must be a one-shot and all-encompassing maneuver, as schools changeover to the new school year over the May – August time frame.

Instructional Improvement System (IIS) – SchoolNet Core Curriculum –SchoolNet offers teachers access to a variety of curriculum (i.e., syllabus, courses, lesson plans, etc.) and instructional materials (i.e., printed materials, videos, etc.) and assists them in assembling those materials into cohesive lesion plans. This application provides tools for curriculum design, development, and best practices.

All curricula resources are aligned to the NC Standard Course of Study that comprises the NC Essential Standards and the Common Core State Standards. The Common Core State Standards cover mathematics and English Language Arts and have been approved by 48 states. The NC Essential Standards cover all other curricula areas.

This application will allow teachers to search for and select instructional materials for use in lesson plans from an approved and standards-aligned curriculum database. Teachers will be able to add or modify the instruction to customize it for student groups or individual students based on assessed needs.

The system will allow teachers to search for lesson plans by standard, grade, discipline, objective, theme, publisher, unit, and so on. Students and parents will have easy access to resources for learning that are specific to each student's assessed instructional needs.

SchoolNet will support the tracking of student activities and assessments directly linked to standards, benchmarks, and/or objectives. Assessments (student tests) or assignments may be linked to instruction and will feature either manual scoring or on-line delivery and automatic scoring. Based on student assessment results, teachers will be able to use the application to identify and assign instructional material to students that specifically addresses the weaknesses uncovered by the assessment. Students will be provided collaborative work areas to work with fellow students as well as the ability to submit questions and get feedback from teachers.

The application has the capacity to assist teachers by allowing them to create, deliver, and manage various levels and types of assessments, ranging from daily classroom formative assessment to LEA interim/benchmark testing to statewide summative assessments.

The assessment component serves as a repository for pre-constructed test items. The component will also display a robust set of tools that allows the teachers and accountability personnel to create and build assessments aligned to instructional objectives. The system will allow end-users to import pre-constructed assessment items/tasks and formats (including rubrics) to augment locally-developed items/tasks. The resources available through SchoolNet will add to the depth of items/tasks available for use at the classroom level across the state.

The assessment function has a well-developed reporting system that will enable teachers to aggregate and disaggregate assessment data from multiple sources to analyze student performance and instructional needs. The ability of the assessment system to effectively aggregate and disaggregate assessment results per user-defined constraints is one of the ways that SchoolNet may be used to improve student outcomes.

Instructional Improvement System (IIS) – OpenClass Learning Management System – This application is a dynamic learning environment that stimulates social learning and enables the distribution of content to students, especially for collaboration among teachers and among students.

To highlight some of the features of OpenClass:

- Dashboard – At a single glance, see a list of all classes and get an aggregated view of activity from students and instructors.
- Submissions – Submit and retrieve assignments from one central location.
- Scheduling – Manage and enter due dates for class assignments.
- A variety of social collaboration, sharing and communication tools.

Instructional Improvement System (IIS) – Test Nav – This application provides a secure testing environment for the administration of high-stakes summative tests.

Identity and Access Management (IAM) Technical Service – The identity and access management (IAM) service will authenticate users and authorize access to the IIS and other RttT applications. The service has three major components: 1) a centralized repository with relevant user information from recognized data sources, 2) a central directory service that contains all user IDs, pass words, and other identity information and provides a master repository for authentication and authorization, and 3) federation software that enables single sign-on functionality.

Learning Object Repository (LOR) – The LOR provides a centralized location for the acquisition, collection, sharing, and management of quality learning resources for all educators in the state. The LOR stores and presents documents, audio/video clips, simulations, learning modules, assessments, and more – virtually any type of digital learning resource. Educators throughout the state can search the LOR via the IIS, find resources appropriate for their classes, and use them to suit their specific needs. The LOR is offered through a joint venture with the Community College System.

Content in the LOR will come from multiple sources (teachers, LEAs, vendors, NCDPI, consortiums; third-party vendors; and more) and will be vetted at several levels to assure

quality and alignment to standards. The development and management of curricular materials will be designed with role-based security to allow for a workflow in which submitted materials go through a review and approval process prior to being included in the official state, regional, district, or school curriculum.

Truenorthlogic Educator Evaluation - This application measures performance against the six NC Professional Teaching Standards:

- Leadership.
- Respectful classroom environment.
- Know content.
- Facilitate learning.
- Reflect on practice.
- Contribute to the academic success of students.

The first five above items involve observation by principles, and the last one is supported by the Education Value Added Assessment System (EVAAS) developed by SAS that predicts a student's performance based on past results. Good instruction will produce test results above predictions and poor instruction will yield lower than expected results. For example, a teacher may be considered meritorious if the end-of-year or end-of-course test results for the class as a whole are higher than the scores predicted by past trend analysis. Lower than anticipated scores can have the opposite indication.

This application will automate the North Carolina Teacher Evaluation Process and the North Carolina School Executive: Principal and Assistant Principal Evaluation Process. It enables all employees to complete self-assessments and professional development plans. It allows employees to set goals annually and provides principals/supervisors with the ability to modify goals and include feedback to employees. By importing student assessment data, the system will enable administrators to consider student growth (actual versus predicted) as one of the measures of teacher effectiveness.

Truenorthlogic Professional Development - – The professional development application adopts a proficiency-based approach to human resource management. Data from the educator evaluation application (above) will enable NCDPI to link and align staff development with curriculum, assessment, learner needs, instructional materials, and the supervision/evaluation process. Educators will be able to create individual staff development plans which address the gaps between their required and mastered lists of job-related proficiencies. The assessment component of the staff development program will not be based upon educators earning a "grade" but rather on attaining specific "proficiencies". For classroom teachers, this may also

include a summary of the curriculum, assessment, and instructional resources that align with the acquired proficiency.

This application assists teachers in researching online courses and performing online registration, as well as providing teacher professional development recommendations based on overall student performance. Principals may recommend a personalized professional development plan that is congruent with the educator evaluation application.

Integration with Shared learning Infrastructure

As part of this work, NCDPI is architecting IIS to interoperate with the national Shared Learning Infrastructure (SLI), now called inBloom, a Gates- and Carnegie Foundation-funded initiative in which North Carolina is one of nine pilot states (one of five Phase I pilot states). inBloom seeks to lower the barrier of entry for software vendors into the education space by creating a common data exchange for them to utilize across the nation.

2. Three Key Race to the Top (RttT) Supporting Applications

Data Integration (DI) Technical Service – The objective of the data integration (DI) project is to create universal access to a wide variety of data sources. Such sources include financial, administrative, statistical, and instructional data. Moreover, the DI project will establish processes to ensure that data elements are trustworthy, accurate, useful, timely, and targeted to each user's particular needs. More specifically, as the operations of NCDPI and NC public schools become more information-intensive and data-driven, the DI effort will provide:

- Capabilities for extracting, transforming, loading (ETL) and verifying data to and from a diversity of the many databases and files geographically distributed statewide and worldwide.
- Processes and routines for validating the accuracy and completeness of data elements.
- System for creating log files and audit trails.
- Processes and technical techniques for data communication, sharing and transfer (i.e., data synchronizing).
- Processes and system for failover and error recovery.
- Tools and other technical components for making data easily available to authorized users.
- System to alert/notify specified personnel of particular data processing events.
- Training plan and delivery of essential training for user and technical personnel.

IS Enterprise Service Bus (ESB) Implementation – This activity comprises the implementation of IBM's message oriented middleware (MQ Series) for data transfer as a technical service from IS. This outsourcing of data transfer to IS represents both a technical transition from currently

employed Oracle middleware providing Managed File Transfer Services (MFTS) and a personnel change from internal NCDPI staff support to the responsibility of IS ESB services. This effort is in concert with the above Data Integration (DI) Services.

NC Education Cloud - The NC Education Cloud (Cloud) portion of RttT follows closely the RttT projects that NCDPI is undertaking; however, it focuses on the LEA. The Cloud intends to provide highly reliable, highly available communications and server infrastructure to support K-12 education enterprise statewide. The Cloud project facilitates the consolidation and sharing of local (i.e., LEA) technical resources, primarily from a central state location. A variety of vendors are involved, including SAS. Six projects of the Cloud (not addressed elsewhere in this document) are:

- **NC Education Cloud Planning –** NCDPI proposes the deployment of the Cloud as an underpinning platform for shared services across the education enterprise. The School Connectivity endeavor transitioned from development to steady state in mid-2010. Specifically, the Cloud effort will establish an authoritative database of school connectivity initiatives, perform cloud services planning and deployment, and provide subject matter expertise to NCDPI regarding connectivity for RttT decision making.
- **LEA AS/400 iSeries Migration** – The iSeries project initially involves the migration of the IBM AS/400 hardware and its finance, human resources, and teacher licensure applications from the LEAs to a SAS-provided Cloud. Key objectives are: 1) to move to a more commodity-oriented technical infrastructure, and 2) to employ more modern and useful technical components. The long-range intent is to provide applications and support services through a new business model that better meets LEA needs at reduced cost.
- **Human Resource Management System (HRMS) Modernization** – The HRMS modernization effort currently is examining the potential for transforming the legacy AS/400-based human resource application into a contemporary technical structure. The replacement of the present functionally deficient and technically outdated application with a new one will better meet business needs at reduced support costs.
- **Annual Media and Technology Report 3.0 (AMTR 3.0)** – The AMTR is a data collection (including inventories of technical hardware and software) and analysis project that is proposed to revamp various technology survey and planning tools. This upgrade builds on the long-standing AMTR collection process.
- **North Carolina Virtual Public Schools (NCVPS) Mobile Infrastructure and Virtual/Blended Courses –** This NCVPS initiative targets improving the quality of instructional delivery methods and resources available to teachers for educating students at risk of failure. The project will make instructional content available through

mobile devices for science, technology, engineering, and math (STEM) courses by enhancing and upgrading the technical infrastructure of the NCVPS.

- **eLearningNC.gov Personalization –** eLearning integration into curriculum is expanding (3,000 enrollments in 2007 to over 46,000 today). This project intends to provide a capability for refining and personalizing the provided content to accommodate changing student needs by collecting and analyzing users' past behaviors, site usage history, and demographic characteristics.

3. Three NCDPI Applications and Initiatives Directly Related to RttT

Additional technology projects and work efforts influential to RttT, but largely address the internal NCDPI efforts for ensuring its success, include:

Statewide Consolidated Reporting Tools and Data Dictionary and Absorption of Legacy Adjunct NCDPI Applications (Called Clusters) into PowerSchool – As with any large public and private organization, data is the lifeblood of NCDPI. Unfortunately, NCDPI has never developed a coherent and comprehensive business information and technical data strategy for the collection, storage, and reporting of the massive amount of data under the auspices of the state public schools. As a result, the agency has developed a wide variety of disparate individual-purpose applications and databases adjunct to NC WISE over the years. As a group, they have become known as cluster applications or "clusters". While successful in satisfying particular business needs, this haphazard approach has resulted in a jumbled and illogical technical applications and data management structure. It is difficult and expensive to maintain and fails to meet NCDPI information requirements for decision making, reporting, and providing accurate data to LEAS in a timely and useful manner.

Major data management, collection, and reporting problems at NCDPI, include:

- Difficulties in creating accurate reports ensuring the integrity of data for RttT due to data standards not being applied consistently across applications.

- Complications in performing research and developing comprehensive reports from multiple data bases and files due to the large number of disparate information sources.

- Challenges in funding, maintaining, and ensuring the reliability and security of the large number of single-use legacy applications.

The implementation of projects for RttT and the associated migration of NC WISE to PowerSchool have provided the opportunity for NCDPI to rethink its business information and data management strategies. This project leverages the PowerSchool initiative and RttT work to revamp the governance processes and technical approaches for data management within NCDPI and between NCDPI and the LEAS.

The guiding principles for the new data management approach regarding student data for NCDPI are stated as follows:

- To the greatest possible extent, student data will be collected and validated by PowerSchool. This will enable uniform validation and consistent functional and technical standards and obviate the need for some cluster applications and associated databases.
- All non-PowerSchool and non-student (e.g., financial and personnel) data, regardless of point of collection and validation, will be consolidated into a central database. This database, in conjunction with the PowerSchool ODS, will be used for statewide reporting purposes using SAS tools.

The goals of this project are to: 1) accumulate, organize, and maintain financial, administrative, statistical, and instructional data elements that are trustworthy, accurate, useful, timely, and targeted to each user's particular needs, 2) enable easy access by a variety of means to authorized State, school and LEA personnel, including the production of statewide reports requiring data from multiple sources, and 3) integrate with or subsume as many as possible non-financial legacy cluster applications into PowerSchool. More specifically, the major objectives of this project are:

- Revise NCDPI's overall data management strategy and associated data governance structure.
- Implement data management and administration tools, such as a data dictionary.
- Develop a comprehensive and well-organized central data reporting capability composed of student data from the PowerSchool ODS and the consolidated data base for student data outside of PowerSchool and non-student data. This work must:
    - Integrate PowerSchool data and non-PowerSchool authoritative data sources (primarily financial and personnel data) to support RttT related educational applications, as well as other local and NCDPI applications.
    - Create compliance and accountability reports (that are not developed in other applications) for school, LEA, and state and federal purposes.
    - Provide tools for supporting a wide variety of analytical needs (such as identifying trends, recognizing potential problems, diagnosing candidate causes, and providing insights for corrective actions), forecasting key statistics for business and administrative planning, predicting potential educational outcomes, and enabling more informed and better decision making.
    - Offering trusted sources of data and an efficient and effective means for providing information to LEAs in formats and ways desired by them.

The objective of the integration with or absorption of non-financial legacy cluster applications into PowerSchool is to eliminate as many as possible currently operational applications, databases, and data files. This reduction in the number of one-use applications will be possible by using PowerSchool to collect and validate as many student related data elements as reasonable and by using the statewide consolidated reporting tools to accomplish the majority of calculations and reporting requirements. These actions will improve the integrity, reliability, security, and efficiency of data operations, thereby creating significant cost savings. In addition, the new PowerSchool

application is anticipated to relieve several pressing shortcomings in other legacy applications not being subsumed into PowerSchool.

The effort to integrate with or subsume the non-financial cluster applications into PowerSchool involves about 25 applications. Pearson is responsible for five applications, and NCDPI staff members are effecting the change for the remainder. SAS will install the statewide consolidated reporting tools, create the data dictionary, develop reports from the PowerSchool ODS and the consolidated data base for state applications not subsumed into PowerSchool, and provide tools and training for delivering data to the LEAs. SAS will also perform other activities associated with developing a comprehensive data management structure for NCDPI.

Student and Staff Unique Identifier - Due to the technical limitations of NC WISE, many applications receiving first-time student registrations were unable to obtain the IDs automatically, leading to a large number of student uniform ID (UID) duplications. These duplicate IDs impeded statewide reporting and analysis, as they had to be researched and reconciled manually before accurate analyses could be performed and comprehensive and longitudinal statistics could be compiled.

The transition of NC WISE to PowerSchool and associated projects spurred the need for a comprehensive approach to reducing the number of duplicate student IDs. The new approach will make use of eScholar Uniq-ID software licensed by the NCDPI to assign unique student and staff IDs regardless of the application used for initial registration. The capability for the automatic assignment of non-duplicate student and staff IDs from a single authoritative source is an absolute prerequisite to:

- Ensuring the successful implementation of PowerSchool.
- Subsuming the cluster of legacy applications into PowerSchool.
- Providing accurate and timely data for statewide reporting.
- Confirming the integrity of student and teacher information given to RttT applications, especially the IIS.

Current students will be allowed to maintain their present IDs throughout their school life cycles.

Transition of NCDPI Help Desk to Support Center - The Transitional Support Center will be a "one-stop shop" that will provide business and technical support for Home Base and other applications to LEAs and Charters. It will be a personalized interaction to address all concerns. The Center will answer technical questions and target business questions to responsible staff from that business area. Data quality analysts will develop and evaluate business processes to ensure the delivery of accurate data to all stakeholders. Once these

processes are implemented, the Center will dissolve and its personnel will carry their skills into the Agency.

The Center will do more than just answer phone calls and emails. Additional duties will include:

- Assimilate and process feedback from the schools and LEAs into forms usable by project teams and leadership to make decisions of all kinds (technical, process, managerial, etc.).
- Document processes and recommend changes to the NCDPI business units to better meet the needs of their constituents.

4. Six Projects Important to the Management and Operations of the State Public Schools, but Unrelated to RttT

Below are described other technology projects not involved in the RttT endeavor but important to the management and operations of the state public schools:

Teacher Licensing Application Replacement – This project involves the replacement of the outdated public school professional certification system with a new web-based application. The new application will make available the following features:

- Online applications.
- Applicant checking of application status in the processing flow.
- Remote viewing and printing of licenses.
- Online reviewing and updating of licensure profiles.
- Employment of digital signatures.
- Processing of fees online.

Direct Certification and Verification (DCV) Replacement – DCV involves the certification and verification of children eligible for free or reduced-price school meals per federal statutes and US department of Agriculture (USDA) rules and regulations. This project replaces the current custom software application with a commercial off-the-shelf (COTS) package (funded by a federal grant). The new application better meets the automated DCV processing capabilities mandated by federal oversight authorities and eliminates problems with the present system.

Child Nutrition Technology System (CNTS) Enhancements – The child nutrition claims system processes $270 million federal and $2 million state funds annually in support of child nutrition programs within state public schools and other institutions. This project will enhance and

modify the system to meet new federal requirements that are mandated to be implemented by late 2013.

Southeastern Exchange of Educational Data (SEED) – The SEED project will enable participating states to track, monitor, and share information for K-12 transfer students who cross state lines. Project goals are: 1) Provide basic student information for a newly registered student transferring from a participating state. 2) Identify students who transfer between the participating states, but may be reflected as drop-outs by their "home" state. The project is expected to provide participating states with more accurate drop-out and graduation rates.

NC PreK-20 – Workforce Statewide Longitudinal Data System (SLDS) - NC P20W SLEDS – The intent of this project is to develop and implement a statewide longitudinal data capability for tracking students from pre-kindergarten through post-secondary education, and ultimately into the workforce. The capability to connect education to jobs in a longitudinal data system will provide value for researchers and local, state, and federal policy makers. In this project, the stakeholder agencies will develop individual deliverables that integrate to form the resulting composite database(s) for access and study.

This project results from a US Department of Education (USED) grant to implement SLDS, linking a broker system with NCDPI, UNC-General Administration, NC Community Colleges, NC Independent Colleges and Universities, and workforce data from NC Department of Commerce. The plan is to use a federated system with a central data broker to allow data sharing within SLDS among the above entities such that each will maintain its own longitudinal data and publish a data dictionary with the eScholar Uniform ID as the primary key.

Salary Audit System – This application: 1) receives monthly detailed payroll records for all certified public school employees (over 100,000 teachers, principals, instructional support, and central office personnel and over $4 billion annual costs), 2) audits salaries for compliance with state statutes, and 3) ensures persons are appropriately licensed for the program(s) in which they are involved. The underlying technology components are many years outdated, and its ongoing operations are at risk. Furthermore, it is not technically compatible with the new teacher licensure system, thus diminishing the benefits from both applications. Accordingly, it merits a high priority for replacement.

5. Two Endeavors Related to Internal Improvements at NCDPI

Internal projects directed toward improving the technical operations, work environment, and productivity of personnel at NCDPI include:

Internal Technical Services Transfer to IS – This endeavor involves a series of work efforts to transition several technology infrastructure services from internal NCDPI staff support to

statewide services offered by IS. Before the transfer of each service, financial and service analyses will be performed to ensure cost savings and service improvements will result. These services are:

- Local area network (LAN) and LAN infrastructure management.
- Enterprise Active Directory (EAD), including migration from Novell Netware.
- Data center operations, including management of servers.
- Desktop support, including inventory of all equipment and virtual desktop management.

NCDPI IT Workforce Remodeling and Expansion of Workload Capacity – NCDPI Technology Services must restructure itself to support the ongoing maintenance and sustainability of RttT, the renovated cluster of older applications, and the restructured data management and reporting system. Present NCDPI staffing may be inadequate in numbers and skills/experience for supporting ongoing operations. Retraining and empowering staff to meet the requirements of new technologies is a major challenge. This effort will work to eliminate legacy applications, reprioritize initiatives, fill job vacancies expeditiously, and reorganize personnel to increase the capacity and ability of the NCDPI Technology Services to satisfy its new obligations.

C. Management Approach for RttT Projects – How the plan will be accomplished and why it will be successful

The implementation of RttT technology initiatives is a colossal undertaking, involving hundreds of educational institutions, thousands of public school teachers and administers, and over two million students and parents. The introduction of such a potentially disruptive technology in such a short timeframe could create dissonance in the education system. The challenge is to minimize the adverse impact on the schools and LEAs and to expedite the return to equilibrium within the new framework.

The composition of RttT is analogous to a series of moving parts that must be solid and good individually, but also must mesh closely together. Analogous to an anchor chain, each link by itself must be strong, but the connection to adjoining links must also be sound for it to do its job.

The successful implementation of RttT requires exceptional competency and professionalism at all levels of the public schools organization hierarchy. Moreover, this large-scale and tremendously complicated endeavor necessitates extraordinary attention and involvement by the state's top educational executives. The technical, business, and management risks of any RttT project are those typical of normal technology implementation endeavors. However, the success or failure of RttT depends on broader-based and higher-order considerations:

- Strategies that are visionary - not misguided.
- Plans that are meticulous and solid - not haphazard and hollow.
- Tactics that are well-conceived - not ill-suited.
- Judgment that is unfailing - not erroneous.
- Management that is proficient - not incompetent.

Most important, while capable management is necessary to ensure the success of RttT, it is by no means sufficient. Far-sighted, action-oriented, and persuasive leadership is essential, especially when problems must be resolved, work becomes difficult, morale becomes cynical, outlooks become pessimistic, success is questioned, or delays and associated alternative plans are being proposed by doubters.

The diagram below depicts the organization chart for RttT. The principal senior executives responsible for the ultimate realization or disappointment of the RttT compose the RttT Senior Leadership Team. Its five members are listed in Note 2 of the chart. Together, they form a cross-representation of experiences, skills, and attributes indispensable for ensuring the success of the endeavor. These people have impeccable credentials, and their areas of expertise include instructional pedagogy, education ecology, public school financial management, IT project management, and IT technical and business management. This group is responsible for the visioning, strategy setting, planning, organizing, supervising, monitoring, trouble shooting, problem solving, and decision making tasks necessary for the technical portion of the RttT to be performed successfully.

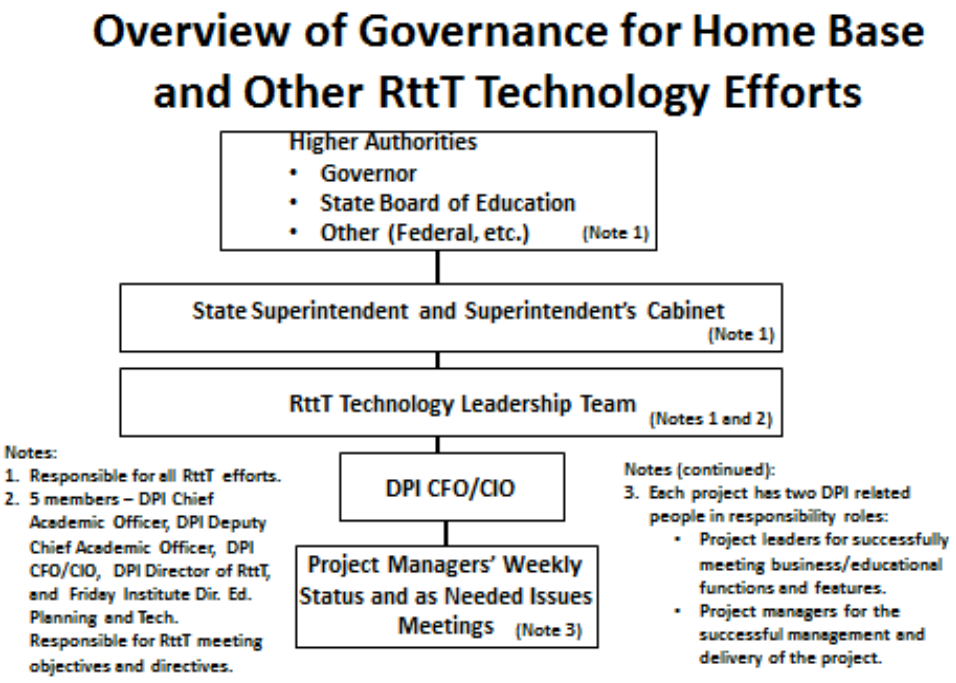
Note 3 of the diagram refers to the approach the State CFO/CIO is using to ensure the overall technical success of the various projects. The following points are pertinent:

- Project managers of each major endeavor report to him, thereby offering control over projects individually as well as the overall initiative.
- A weekly status meeting, involving project managers and other key staff, is held for presenting and discussing project status, issues/problems, risks, decision points, schedules/plans, and other key technical and business/educational items confronted by work efforts, events, and circumstances.
- Clear definitions responsibility and accountability for project leadership have been defined and implemented:
    - Project Leader - Responsible for the successful completion of the project, especially for the business/educational functional capabilities. That is, the project is being pursued in a manner to successfully meet business/educational functional needs and capabilities and the related expected benefits will be achieved.

- IT Project Manager - Responsible for the successful management of the project so that both business/educational and technical objectives are achieved. That is, the project is delivered in a successful manner. The management of the project involves the typical project management tools, processes, and methodologies espoused by PMI.

As described earlier in this document, the projects are closely related and intertwined. As a result, many individual activities of any project impact efforts of other endeavors. Therefore, in addition to the coordination efforts of the weekly status meetings, the project managers and leaders have been instructed to work together on a ongoing basis to achieve additional synchronization of work tasks.

The RttT is a mammoth, once-in-a-generation exertion. The last NCDPI endeavor of this importance and magnitude occurred 30 years ago, and the managers responsible for that work have long since retired. While the senior executives composing the RttT Leadership Team are fully qualified and unquestionably capable of leading this undertaking, its success is highly dependent on their dedication of time and attention to it. Moreover, since the RttT Leadership Team is responsible for the coordination of activities among the projects, it must continuously attempt to anticipate incongruities and prevent adverse consequences from a lack of effective synchronization among the various work efforts. There are many potential points of failure in RttT, and a single one could collapse the whole technical infrastructure in a domino effect.



C. Remodel K-12 in NC – Why the plan is proposed

An educated workforce is vital to the economic development of the state. In turn, economic development has a direct link to the health, well-being, standard of living, and prosperity of the state's citizens. Persistent challenges for K-12 schools include:

- Reducing dropouts to enhance opportunities for all students to graduate and become contributory citizens.
- Decreasing the gaps in test scores among socioeconomic classes and demographic groups to foster equality in economic success and achieving life expectations.
- Preparing graduates to participate in the global economy where the only constant is continuous change and uncertainty is ubiquitous.

The overall goals are for all students to graduate and for all graduates to have the right knowledge and skills to meet workforce needs and lead personally fulfilling lives.

Noteworthy education reforms outside of the RttT, but congruent with it, include:

- Implement the new standard course of study (including national Common Core State Standards in Math and English Language Arts) in every subject, effective the present school year.
- Continue the evaluation system that reviews every teacher every year, and integrate the evaluations, required end-of-course and end-of-grade exams, and common exams with teacher pay-for-performance and tenure reform being carried out by the General Assembly.
- Deploy technology-enabled learning, including digital textbooks, technology-delivered instructional materials, communications devices, and automated student assessments.

RttT is an act of conviction and confidence that the combination of modern technical infrastructure and innovative classroom-oriented and student-focused applications with properly trained and qualified teachers has the potential to transform public school instruction and yield dramatic improvements in student performance and education outcomes. RttT has the probability of being as influential to the delivery of public school instruction as turn of the century web technologies, internet and cellular communications, and social media have been to business, electronic commerce, and personal interactions.

The technology provided for the RttT and incorporated in this plan is:

- Responsive, as it is driven by the challenges of the public school instructional, administrative, and business environments.

- Visionary, as it incorporates the latest advances in tools and capabilities from both functional and technical perspectives.
- Trustworthy, as it provides for privacy and security.
- Available, as it allows for access through all channels – mobile, social, web, physical – all supported by systems and networks.
- Robust and expandable, as it is reliable and has the capacity to grow quickly to accommodate changing demands.
- Collaborative, as it encourages and facilitates cooperation and sharing of pedagogical knowledge and instructional tools among its many participating entities.

D. Major Participating Organizations and RttT References – Who is helping to implement the plan and sources for further information

NCDPI is the central organization responsible for the execution, support, and sustainability of RttT. While there are a multitude of important educational interest groups, technology providers, and public school entities; a few organizations stand out as pivotal to the implementation of the technical components of RttT:

- The Friday Institute for Educational Innovation (https://www.fi.ncsu.edu/ and https://www.fi.ncsu.edu/what-we-do/infrastructure/) – Led by Director of Education Planning and Technology, Phil Emer, the FI is prime driver for the RttT technology effort. Its staff has accomplished extensive planning work for both the DI-ODS and IAM projects, also leading the procurement and implementation work for the latter. Moreover, it is the principal planner and implementer of the Cloud projects, including the immensely successful School Connectivity work.
- The State Chief Information Officer (State CIO) and Information Services (IS) (https://www.scio.nc.gov/ and (http://www.its.nc.gov/) – Statewide IT purchasing and project approval and oversight are among the State CIO's responsibilities; therefore, he and his staff have been deeply involved in procuring vendor services for each of the core RttT endeavors, as well as other supporting efforts. Moreover, this group will be intertwined in the audit and review of each project, as it passes through the phases of the state's project approval and monitoring process and associated Project Portfolio Management (PPM) tool.

  The IS organization provides a variety of technology services, many of which may be used internally by NCDPI and for RttT. The IS Service Catalog can be found at http://www.its.nc.gov/serviceCatalog/default.aspx. Equally important, IS is a reservoir of technical talent. If mutually convenient, IS may be able to supplement NCDPI and vendor staff for addressing unique technical issues.

Some representative references related to the NCDPI and RttT are listed below:

- Department of Public Instruction and Public Schools of North Carolina - http://www.ncpublicschools.org/.
- Race to the Top (RttT) - http://www.ncpublicschools.org/rttt/.
- The Cloud and other endeavors of the Friday Institute - https://www.fi.ncsu.edu/what-we-do/infrastructure/.