THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

Bureau of Financial Administration
Office of Fiscal Management – Contract Administration Unit

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May 5, 2011

Mr. Daniel Ryan
Chief Auditor of State Expenditures
Office of the State Comptroller
110 State Street-11th Floor
Albany, NY 12236

Re: #CR 10-080 Single Source Provider – Wireless Generation, Inc.

Dear Mr. Ryan:

The attached request for exemption from the advertising requirement in The New York State Contract Reporter for the vendor and purpose stated above is being forwarded for your review. The appropriate staff has been notified that if an exemption is granted, the office must still submit an announcement to The Contract Reporter.

Please forward your response to me at the following address:

NYS Education Department
Fiscal Management
Room 505W EB
Albany, NY 12234

If you have any questions or require further justification, please contact the undersigned at 6-4987.

Sincerely,

William Artini
Contract Administrator

Attachment

NEW YORK STATE EDUCATION DEPARTMENT

CONTRACTS

TO: Dan Ryan	**DATE:** May 6, 2011
FROM: William Artini	**OFFICE:** Contract Unit
SUBJECT: Permission to enter into a single source contract	

I am requesting permission for an exemption to posting in the Contract Reporter and to enter into a single source contract with Wireless Generation, Inc. to develop software to be deployed statewide to allow teachers, parents, and school administrators to view and collaborate on the use of student data. This software development is necessary to fulfill the requirements of the State's Race to the Top grant award and forms the foundation of the State's reform agenda to improve instruction, teacher preparation, and support for struggling schools.

Requested term: June 1, 2011 – September 30, 2014
Total Contract Amount: $26,894,498.00
Contract number: C010782

Justification

RTTT: Requirements and Timeline

The Race to the Top (RTTT) competition required that states propose comprehensive and innovative reform initiatives over a four-year period in the areas of standards and assessment, teacher preparation, school improvement, and data systems. New York's RTTT award is based on the foundation that educators, parents, policy leaders, and researchers will use a statewide instructional data system – or Education Data Portal (EDP) – to access and analyze educational data, make decisions, and take actions to improve student outcomes. New York was awarded $50MM to build this system.

Since programmatic improvements must occur within the four-year period, it is necessary that the EDP be built and launched by the fall of 2012 – a little over two years following the RTTT award. This is an extremely challenging timeline. However, since all other reform initiatives are based on the use of the instructional data system, this timeline must hold.

In order to meet this challenge, the proposed contract is intended to provide timely and high quality deliverables while reducing risk and costs by leveraging the State's best data system practices.

Building on Strengths and Partnerships to Reduce Cost and Risk

New York City Department of Education's (NYCDOE) Achievement Reporting and Innovation System (ARIS) serves approximately one million students in New York City, or approximately 35% of the State's students and their parents. It is an educator- and parent-facing student data and knowledge management system built in partnership with Wireless Generation, Inc.

(WGen) and has received national recognition from Arne Duncan, U.S. Secretary of Education.

ARIS' features include teacher and parent views of student data, a parent information portal translated into 10 languages, and a collaborative online community through which best practices can be shared. ARIS was developed by NYCDOE over the past 30 months with an approximate investment of $80 MM in public funds. In working with New York City to construct ARIS, WGen has developed solutions for educator, administrator, and parent use cases that are representative of those that exist across New York State.

Below are some of the business and technical reasons WGen is uniquely equipped to provide the same service for the entire state:

Business	• WGen has invested significant time and resources in end-user research with NYCDOE educators to determine the ideal ways to display information for educators to engage in data-driven instruction. The research includes focus groups of educators and administrators, user surveys, interviews with subject matter experts, and analysis of system usage data. They have built views and reports that enable educators to quickly and easily analyze New York State and Regents test data. • WGen has built ARIS for New York City in a way that enables data from other tests to be loaded and displayed. Because New York City leaves decision-making about interim assessment and instruction in the hands of principals, the City is essentially a "mini-state," and ARIS supports more than 30 different assessment types in its current implementation. In addition to having universal access to New York State and Regents assessment data, regions across the state could use this developed technology to include other data in the system based on the key assessments and metrics relevant to their district. • WGen has worked to develop ARIS Parent Link, which provides parents with data about their students' academic performance and attendance. In addition, parents are able to access tutorials to learn more about New York State and Regents tests and standards. o This online system has the potential to reduce the amount of money spent on printed materials to communicate with parents and families. • WGen currently supports a taxonomy that aligns to New York State standards and is determining the necessary steps to accommodate the Common Core State Standards recently adopted by New York State. • In addition to displays of student data and information, WGen supports a knowledge management system in ARIS. It contains instructional resources and content that can be aligned with the New York State standards taxonomy, and eventually the Common Core State Standards. o This knowledge management platform enables the timely delivery of key instructional materials from central NYCDOE divisions to educators at all levels. • In working with the NYCDOE, WGen has been charged with building a system under a philosophy of transparently making student data

	accessible to multiple authorized stakeholder classifications in order to maximize student achievement and organizational accountability. • In building ARIS, WGen has built a system that highlights key metrics for upward reporting (from the city to the state, the state to the federal government). • WGen has developed the vocabulary used throughout New York State for student classification and demographic information. ○ For example, WGen understands what "ELL" (English Language Learner) means and how analysis of data for students who are classified as "ELLs" would be relevant for an educator.

Technical	• WGen has experience receiving, loading, and displaying data in their system that was sourced from the eScholar data model in use by all of New York State.
	• WGen has developed a user interface and data model allowing New York City users to access data on the macro (city wide) or micro (classroom) depending on user objectives.
	  ○ The same theory could be applied to allow New York State users to access data across the entire state.
	• WGen has developed subject matter expertise across their technical teams as it relates to New York City and New York State academic and attendance data.
	• WGen has developed and maintained an existing code base that is platform independent based on web and internet standards and is likely to reduce time to market for any similar application.
	  ○ WGen can build quickly because of the existing code base that they can add to or modify without having to construct it from scratch.
	• ARIS is designed to be accessed by a web browser, meaning that all of New York State's educators should be able to easily access it.
	  ○ For example, ARIS works on Macs, PCs, tablets, smart phones, etc. The user is not locked into a specific device platform to take advantage of the system.
	• In work with the NYCDOE, WGen has evolved their technical solution by trial and error to meet the unique needs of a system of our diversity and size.
	• WGen has worked to integrate data across many platforms, including relational databases, mainframes, flat files, third party extracts.
	• WGen has built a secure environment for communicating student data to both schools and school support organizations
	  ○ WGen has developed a security model based on a New York City functional hierarchy allowing differing levels of visibility.

Rest of State

Outside of New York City, New York's school districts are organized into Regional Information Centers (RICs), BOCES, and regional data centers. These regional instructional data systems are not as technically sophisticated as is NYC's ARIS system, nor are they capable of addressing the number of users on a statewide scale as is required by the RTTT application. However, there are pockets of excellence in reporting and instructional support

that have developed over the past ten years that we propose to expand statewide through remaining RTTT and other federal grant funds (not part of this proposed contract). For example, we intend to develop the functionality to allow a user to log in to the statewide data portal as described above, and, through a statewide single sign-on solution, the user will be able to navigate seamlessly back to his or her regional data system for local reports, which were developed using the statewide Cognos reporting license and have been customized for local needs and aggregate reporting purposes.

Multi-State Partnerships

Finally, the risk and cost of this contract are further reduced by New York's planned participation in a multi-state consortium supported by the Bill and Melinda Gates Foundation (BMGF) and the Carnegie Corporation. Also in partnership with WGen, the BMGF is proposing to build a national non-proprietary data platform (a "Shared Learning Infrastructure" or SLI) that will integrate and store the instructional data of participating states / large cities to deliver fast performance and allow third parties to build additional functionality as needs arise. The Carnegie Corporation, in coordination with the Council of Chief State School Officers (CCSSO), will support the long-term sustainability and governance of this consortium.

Transition to Vendor Neutrality, Future Functionality, and Reduced Costs

New York is well aware of the risks of large-scale technology projects that to tend to run over budget, behind schedule, and be under-whelming when delivered. This single-source agreement will minimize these risks by engaging WGen, based on its demonstrated capacity, to extend and expand ARIS system functionality from New York City to New York State. In addition, this contract will be structured such that there will be no necessary dependence on WGen for any future services.

The EDP will be non-proprietary and open in its design. WGen has agreed to release all intellectual property from ARIS as part of the development of the EDP. This will have the long-term benefit to the taxpayer in that all future development, operations, and maintenance of the EDP will be open to competitive bidding. Further, when ARIS is converted into a statewide system to be sourced by the statewide data model (eScholar), the underlying instructional data platform will be constructed, and its specifications published, such that future functionality (applications to run within the platform) can be designed and added by anyone (teacher, school district, BOCES, Regional Information Center, commercial vendor) who wishes to add functionality to the system so long as they have the capacity for Java programming (an open language). To facilitate this ongoing and open development of applications for the platform, the contract vehicle will be structured to maximize co-development activities between WGen and SED internal staff, as well as develop the documentation necessary for knowledge transfer to SED and its subsequent vendors. This open platform will reduce the future integration costs for LEA functional improvement by providing an integrated and open source of statewide data for development and access by authorized users.

Other Vendors

Although there are other vendors that provide data applications to teachers and parents, there is no other vendor with the experience, demonstrated capacity, or aligned business model to build a open-source, non-proprietary portal solution that leverages the data systems already developed by NYCDOE and the rest of state, as well as the collaboration application / knowledge management system in place in New York City, with the same degree of risk reduction for a state the size of New York within the time period allowed by our RTTT funding.

Summary

In order to address the critical timelines for RTTT implementation and education reform in New York, it is proposed that the State enter into a single-source contract relationship with Wireless Generation, Inc., the vendor responsible for the development of ARIS. The cost of this single source contract will allow the State to extend ARIS's scope and technical sophistication to all teachers, parents, and students in New York State. Because ARIS contains a module to include aggregate reporting through a traditional business intelligence tool, the State will be able to integrate its existing Cognos statewide license into ARIS, thereby incorporating all statewide best practices into one seamless statewide system (the New York Educational Data Portal or EDP).

The combination of leveraging the initial $80MM investment that NYCDOE has made, while integrating other state-supported regional data development into a single system that is non-proprietary and open such that anyone can develop future applications – whether at the States' request or to fulfill a regional need – is a wise use of taxpayer funds while allowing the State to stay on timeline for its fuller educational reform initiative funded by RTTT. It is a solution that solves today's need, incorporates the best of what is happening throughout the State, is consistent with long-term multi-state partnerships, and prepares us all for tomorrow's unknowns.

WGen is uniquely qualified for this request due to its work in the New York City school system to create successful data application software that has received national recognition.

The services to be provided by WGen in this contract will include the following:

- Project Plan;
- Quality Assurance Plan;
- Technical specifications and documentation;
- Installation and 18 months of operations support, with transition to SED or a third-party vendor;
- Three releases, each with increasing functionality and acceptance testing;
- Two years of software code maintenance, with transition to SED or a third-party vendor.

Reasonableness of Cost

New York will purchase all hardware and data center co-location services (including space, power, cooling, etc.) for this system through OGS contract procurements outside the scope of this contract. Additional functional features (e.g., single sign-on integration with Rest of State data reports, additional data applications) will be developed through separate procurement initiatives.

The proposed budget for the development of the EDP is attached (see Exhibits A and B). The budget has been prepared on a fixed price deliverable cost basis.

The "reasonableness of price" test for the software development aspect of the project has two key criteria. First, is the New York State taxpayer receiving the maximum value for its total dollar expenditure on the project? Second, is the vendor delivering that value via a business model that is fair, reasonable, and consistent with industry standards?

Maximum Value for Total Dollar Expenditure

As basis for the maximum value consideration, consider the following assets and advantages that are uniquely included in this project based on Wireless Generation's participation:

1) The ARIS codebase. While New York City Department of Education owns the ARIS code, the license negotiated with Wireless Generation allowed NYCDOE to distribute the code to Local Education Agencies but granted Wireless Generation the exclusive right to distribute the code to State Education Agencies. While NYCDOE could contribute the ARIS code to other LEAs in New York State, governance and hosting challenges would overwhelm the project. As part of this single source contract, WGen has agreed to release its exclusive right, giving NYSED access to the full ARIS code base for statewide use.

   To properly value the ARIS code base, the best metric is the amount expended by NYCDOE on its development. NYCDOE spent $80 MM developing the software. This $80 MM asset will be included in the EDP as a direct result of this contract.

2) The ARIS data model. The ARIS data model is the same model that WGen uses to operate its core assessment and instruction business. As part of this single source contract, WGen is agreeing to release its data model under an open source license. The value of this model is $2 to 3 MM on a build versus buy analysis, or $1.5-3M/year on a license analysis (e.g. $0.50 - $1.00 per year license for the model, either as a component of WGen's software license model, or as compared to other data warehouse models, multiplied by the New York student population).

3) Familiarity with the ARIS codebase. Even if the license release was not a constraint on the use of the ARIS code, WGen has a singular advantage based on its familiarity with the code. For another vendor to pick up the codebase and develop the application extensions, we would expect this would cost at least $2 to 3 MM for its architects and engineers to come up to speed on the software, plus the cost for the new application development. This $2 to 3 MM new-vendor differential will be

mitigated by the proposed contract's explicit focus on co-knowledge development, transfer, and creation of technical documentation.

4) Speed of implementation and reduced risk. As noted previously, this project is on an extremely tight timeframe, and is central to the overall implementation of RTTT. WGen is familiar with ARIS and with New York State data sets. They have a software team standing by with available architects, user experience engineers, and developers who are intimately familiar with the existing software. By leveraging this team's knowledge and expertise, we will be able to deliver this project significantly faster and with lower risk than any alternative scenario.

5) Compatibility with existing state data model and reporting tools. Over the ten year period to end in the 2014-15 fiscal year, SED will have invested over $20MM in its statewide data warehouse license (eScholar) and $9MM in its statewide business intelligence reporting tool (Cognos). By integrating with existing New York investments and its statewide knowledge base, this proposed contract significantly reduces cost and risk over alternative instructional reporting options that would require a stand-alone solution.

Reasonableness of Cost Consistent with Industry Standards

NYSED has engaged in sustained planning sessions and budget negotiations with WGen over the past five months in order to exercise its due diligence to arrive at a proposed scope and budget that are accurate and consistent with industry norms for effort and expense rates.

Overall budget

The proposed summary budget totals $26,894,498 after an across-the-board 8% discount (see Exhibit A). Project deliverables include the data platform features, portal functionality, the Connect collaboration application, an application programming interface (API) for the Connect collaboration application, the data Views application, the Parent Link application, as well as operational costs for infrastructure setup, technical operations (with transition planning to NYSED or another vendor), and software maintenance (with transition planning to NYSED or another vendor). Each deliverable is broken into domains with associated domain totals, deliverable subtotals, and an 8% discounted subtotal.

Since the proposed budget is built up as an aggregation of contractor role by amount of effort by expense rate for each deliverable subtask and domain, we approached the reasonableness of cost analysis through separate but interwoven reviews of reasonableness of effort and rate.

Reasonableness of Effort

Since there is no other project of comparable function and scope, other than ARIS, NYSED needed to utilize a reasonableness of effort methodology that could be reviewed objectively. NYSED required WGen to engage in an internal estimation effort that was reviewed by NYSED staff and an independent contractor. In addition, WGen provided an in-depth walk-through of the estimation process to a panel of NYSED representatives for several of the

deliverable domains. The methodology produced an estimate of the number of hours by contractor role that would be necessary to build and support this suite of complex software.

Estimates of Effort by Role

WGen's estimates of effort by role for the data platform features, portal functionality, Connect collaboration application, an application programming interface (API) for the Connect collaboration application, the data Views application, and the Parent Link application were determined through the following steps:

1. The development time required for each component in terms of effort (not elapsed time) was estimated by WGen's software architects:
    a. A first software architect produced a breakdown of tasks or sub-components required for a component. (A combination of architects with different areas of expertise was involved to cover the full EDP scope.)
    b. A second, different, software architect reviewed the task breakdown for each component. Differences were resolved in a meeting.
    c. Estimates in "ideal hours" (no interruptions) were produced for each line item, based on previous experience (including WGen's experience building ARIS). Tasks that were too big to be estimated were broken down into smaller parts whenever possible.

2. Task-level estimates were aggregated and compared to the actual time spent on previous projects of similar scope or complexity – in this case ARIS and WGen's mCLASS:PK12 assessment product line, both large-scale software projects based around education data and reporting, together serving over 200,000 educators.
    a. Differences with previous projects were examined, and estimates at the aggregate level were adjusted based on qualitative differences with previous projects.

3. This total development effort was distributed in the "Budget by Role" spreadsheets (see Exhibit B) between ***"Architect"*** and ***"Developer"*** to reflect the mix of seniority of the engineers forming the corresponding teams.

4. Several roles supporting the development process were estimated, based on actual time spent on previous projects of similar scope or complexity, in proportion to the number of Architect and Developer hours estimated as described in (3) above. (Note that this excludes non-development components, namely Infrastructure Setup and Technical Operations, which were estimated differently as described later.)

    a. ***"QA Engineer"*** time represents between 30% and 60% of the development effort, the ratio being adjusted based on:
        i. The "surface" of functionality to be covered by Quality Assurance, e.g.:

1. Pure back-end or framework components usually have a low Quality Assurance to Development ratio.
2. Data integration components typically have a very high Quality Assurance to Development ratio because of the number of possible inputs to verify.
3. User Interface screens also have a very high Quality Assurance to Development ratio because of the number of user click-paths and interactions to verify.

ii. Development timelines, as shorter timelines yield disproportionately large development teams because of development efficiency loss.

b. Project Management time is split by seniority between ***"Project Manager"*** and ***"Associate Project Manager"*** and typically represents between 25% and 45% of the development effort, the ratio being adjusted based on:
   i. The surface of functionality to be covered (more functionality generates more issues requiring management time to address).
   ii. The number of product stakeholders involved and the expected nature and complexity of specification and customer coordination activities.
   iii. The overall size of the project and number of teams with which to coordinate development and manage dependencies.

c. ***"Senior Architect"*** time typically represents between 5% and 15% of the development effort, and corresponds to the number of technical leads required to drive and mentor technical teams and review their choices and code. This is not time spent on actual development tasks and as such isn't covered in the initial development estimate. The ratio is adjusted based on:
   i. The critical nature and risk level of the technical work to be performed.
   ii. The overall size of the project and number of teams with which to coordinate development and manage dependencies.

d. ***"IT Engineer"*** time represents between 0% and 20% of the development effort and corresponds to the IT staff required to provision, configure and troubleshoot development environments, such as Unix Engineers provisioning Virtual Machines on shared servers, or Database Administrators troubleshooting query performance or file system input/output with developers. This ratio is adjusted based on:
   i. The actual need for server-side infrastructure (some data modeling or front-end components don't have any).
   ii. The reliance on databases or other high-performance components to be tested in production conditions.

5. Additional specialized roles were added if needed:

a. ***"Business Analyst"*** and ***"Senior Business Analyst"*** time was allocated based on effort estimation by Senior Business Analysts and represents working with the specification teams on analysis of data and business requirements, the authoring of functional and data specifications, and the review of business rules and visual designs. Estimated "Business Analyst" effort varies largely depending on components: data modeling or user interface-heavy tasks typically required significant analysis time; whereas back-end or infrastructure are essentially devoid of it, with all analysis and requirement gathering being done by Architects. Business Analyst estimates for the Data, Views and Connect components - and the corresponding breakdown by seniority - were informed by very similar previous engagements.

b. ***"Usability Engineer"*** and ***"Visual Designer"*** time was allocated based on effort estimation by the product design team and accounts for the design and usability-testing of all new User Interfaces for components that have them. ***"Art Director"*** time is assigned by formula based on the "Visual Designer" time and represents the direction and review of designs by senior staff (approximately 25% of visual designer time).

c. ***"External Experts"*** time accounts for external industry specialists WGen plans to subcontract out to:
    i. Inform and review data models in light of other existing implementations or local needs (e.g. Systems Interoperability Framework specialists, designers of data systems for specific school districts or state agencies, former product designers for other K-12 vendors).
    ii. Provide initial guidance and ongoing review on best practices in problem areas that are known to be widely and successfully solved already outside of K-12 (e.g. directory and identity management specialists).
    iii. Review data, network, and code security matters.
    iv. Provide specialized consulting on deep, vendor-specific matters (e.g. network configuration, physical infrastructure design).

6. "By Role" breakdowns were aggregated and compared to time actually spent in the past on similar projects and adjusted if discrepancies were found.

7. **Software Maintenance** was estimated at an industry standard 15% per year of the total effort involved in developing the software.

Estimates of Effort by Role for Infrastructure Set-up and Technical Operations

WGen estimated the effort by role for infrastructure setup and technical operations (with transition planning to NYSED or another vendor) based its previous experience designing, deploying and operating K-12 applications such as the mCLASS assessment platform and ARIS.

Infrastructure Set-Up

- ***Specification*** was estimated at 570 hours, representing a little less than two full-time equivalents (FTEs) for the three months of the initial specification period:
    - Senior Architects to establish the technical blueprints and lead the team.
    - Architects, Developers and IT Engineers to
        - flesh-out designs and perform the implementation and evaluation of proof-of-concept infrastructure hosted on comparable hardware, as required for proper hardware/software sizing and establishing specifications for all environments (from Development to Production) to allow NYSED to purchase these in bulk and leverage larger discounts.
        - work with the co-location data center provider to establish specifications for the data center and provide physical design diagrams and documentation of all environments in support of future knowledge transfers.
        - create detailed logical network design diagrams and documentation of external (ISP and inter-site connections) and internal (internal addressing, virtual local area networks (VLANs), secure segmentation, connections between devices: firewall, load balancers, switches, routers, servers, etc.) connections in support of future knowledge transfers.
    - Minimal support from a Project Manager to coordinate this strand with other specification teams and NYSED stakeholders.

- ***Production (Prod), User Acceptance Testing (UAT) and Development (Dev) Environment Hardware Setup*** was estimated at 720 hours, representing a bit less than 6 FTEs for two periods of about two weeks each (one for the Prod / UAT environments, and one for the Dev environment):
    - A majority of IT Engineers to
        - Install structural cabling between racks, each rack with redundant patch panel layout leading to corresponding patch panels in communication/network racks. The estimation was based on approximately 15 racks with 48 port patch panels within each rack and these would be leading to network/communication racks, totaling around 1440 ports. (WGen used a comparable previous deployment as a reference for estimating this task – in which the cabling of 10 racks represented a 7 days effort for two persons).
        - Install fiber cabling for Storage Area Network (SAN).
        - Unpack devices, assemble server components (memory, CPU, drives) if needed, rack servers, connect power/network/fiber to servers.
        - Deploy at least two redundant communication racks with all networking equipment.

        - Deploy and configure power management system and power distribution units.
        - Perform initial configuration of network devices.
        - Perform initial configuration of fiber SAN switches, storage devices and table library.
        - Perform initial configuration of out-of-band management interfaces on all servers, as well as deployment of out-of-band servers to manage network devices (Sizing assumptions have been based on similar projects, and assume a total of 80 to 100 physical servers across environments, a subset of which will be further split into virtual machines, for the most part to support development environments).
        - Update firmware on all devices.
        - Label all devices, including all cabling.
        - Capture all devices in inventory/configuration management system.
        - Establish detailed documentation of deployment and update design diagrams.
    - Minimal oversight from Software Architects who were part of the initial specification and design effort.
    - Support from Project Managers to coordinate with data center staff and other stakeholders.

- ***Prod, UAT, and Dev Environment Software Setup*** is estimated at 2065 hours, representing 4 FTEs for a period of about 15 weeks:
    - A large majority of IT Engineers, and in particular:
        - Unix administrators to deploy and configure operating systems, configuration management systems, virtual cachines and shared services such as domain name system (DNS), email or lightweight directory access protocol (LDAP).
        - Storage engineers to configure shared file-systems, enterprise storage and back-up systems.
        - Network engineers to deploy and configure networking equipment.
        - Database administrators to deploy and configure all required database instances.
    - Support from Project Managers to manage dependencies and coordinate in particular with the large number of development teams in need of development environments.
    - Minimal oversight from Software Architects who were part of the initial specification and design effort.

- ***Integration, Automation/Management tools, and Documentation*** is estimated at 6413 hours, representing an average of five FTEs over a period of eight months:
    - A majority of IT Engineers to
        - Configure and customize performance monitoring systems.

        - Script common maintenance and deployment tasks.
        - Author runbooks.
        - Help manage the transition to a new vendor.
        - Organize, document and script release processes for all custom software, involving a specialized Release Engineer.
    - Software Architects to design and implement custom automation tools or application performance instrumentation modules when needed.
    - Support from Project Managers for coordination and dependency management.
    - External experts / outside consultants to:
        - Provide training to WGen's internal teams on vendor-specific equipment or software.
        - Configure vendor-specific network or storage equipment.
        - Configure or customize vendor-specific monitoring or performance management systems.
        - Audit information security at the infrastructure or network level.

Technical Operations

WGen estimated the costs for ongoing technical operations of the system based on its experience of the size of team necessary to ensure highly reliable and on-performance access to a system of this size and user base (for example, ARIS and the mCLASS assessment system).

Operations was estimated at the equivalent of 2 FTE IT Engineers for monitoring and incident handling, with additional support from project managers (e.g., to manage communications with NYSED staff, especially around incidents) and Developer and Architect time as needed to verify that system is working as expected, including required time for detailed documentation that will allow a more in-depth transfer of knowledge.

Detailed Walk-through of Estimation of Effort by Role

Finally, in order to provide further confirmation of reasonableness, WGen provided an in-depth walk-through of the estimation process to a panel of NYSED representatives for several of the deliverable domains. Domains were selected for this exercise based on their proportion of the budget and/or the complexity of the development effort. These included: features of the data platform (sample data, automation, integration tests, handling of bulk exports, support for integration with the SLI); features of the data portal (integration with State identity management system and single sign-on protocols); and features of the Views application (extension of SLI Views application to include New York-specific functionality).

Reasonableness of Expense Rates

Again, since the proposed budget is an aggregation of role by effort by rate for each deliverable subtask and domain, once we had confirmed the reasonableness of the effort by role, we needed to confirm the reasonableness of each of the expense rates.

To compare rates, each of the roles on WGen's rate card was reduced by 8% to reflect the off-the-top discount that was negotiated. Exhibit C displays an analysis of the percentage that WGen's discounted rate are above or below several comparison benchmarks, including an average rate across seven existing technology contracts; an average of OGS not-to-exceed technology rates; an average of Gartner's national 2010 survey (including the 15% rate differential that Gartner allows for NYC-based vendors); and the maximum rate for each mapped role in Gartner's survey.

This comparison is complex and somewhat unsystematic, and is limited by several factors, including the validity of the role mappings and the similarity of the technical work across comparison contracts.

Overall, WGen's discounted rates ranged from 13% below (Project Manager) to 121% above (Art Director) when compared to the average rate across seven existing technology contracts. For this comparison, the mean discrepancy (excluding the 121% outlier) was **10.5% above the average**.

WGen's discounted rates ranged from 10% below (Senior Architect and Senior Business Analyst) to 51% below (Associate Project Manager) when compared to the average of OGS not-to-exceed rates. For this comparison, the mean discrepancy was **24% below the average**.

Although its rates were much higher (ranging from 24% to 117% above) than the national average contained in the Gartner 2010 survey, WGen's discounted rates were between 30% below and 14% above the maximum rates found in the Gartner national survey. For this latter comparison, the mean discrepancy was **6.8% below the Gartner maximum**.

For roles where there was very little – if any – comparison information available (e.g., Art Director, Usability Engineer, Visual Designer), NYSED staff spoke with colleagues in the field to determine that WGen's rates were roughly comparable to industry norms. These roles account for a very small percentage of the overall project budget.

Rate Comparisons in Context

One should view these rate comparisons in the context of WGen's uniqueness within the educational technology industry, including the depth of its education-specific expertise, the extent to which its staff exceeds the minimum qualifications contained in the role comparisons, and the economic factors in place in the New York City metro environment, which simultaneously increase both the talent pool and cost.

Team Quality and K-12 Educational Focus

Wireless Generation is exclusively dedicated to K-12 education, with a decade of experience delivering high-volume complex educational software to schools, districts, and states around the country. WGen considers its team an educational "product team," rather than a generic software or consulting shop.

Team Quality:

- WGen hires only the top 10% of software engineering talent. WGen's estimate of the size of the EDP project – both duration and effort – depends on this level of skill. With a team of a different caliber, WGen would have estimated both a longer duration and greater effort to deliver the project.
- To recruit for the top 10%, WGen uses a multi-stage, calibrated interview process, which includes individual and team interviews as well as sample projects and code reviews. They review each candidate's theoretical understanding of computer science and examine their work to determine whether they meet the standard.
- The vast majority of WGen's engineering team has a degree in Computer Science or related fields (e.g. engineering or mathematics), assuring a theoretical foundation for high-quality software engineering. In addition, more than 40% of its software developers have an advanced degree.
- Another view of the caliber of its team is the competition for its talent. WGen competes directly with companies like Amazon, Google, Facebook, and Goldman Sachs. WGen needs to offer competitive salaries in tight job market.
- By locating in Brooklyn, WGen is able to tap a larger pool of top talent than one would find elsewhere in the country. The Robert Half Technology survey puts the salary premium for basing in New York City (versus the national average) at 1.4%. This salary differential will drive up rates more than the 15% allotted by the Gartner survey.
- Unlike many software vendors, WGen approaches quality assurance checking through automated processes, increasing the efficiency and quality of the work. Two-thirds of its quality assurance team is software automation engineers, responsible for developing test scripts. This will allow the development of an automated testing framework that will support maintenance and ongoing development by NSED post-transfer.
- WGen's Senior Business Analyst and Business Analyst roles are staffed by "product designers" with extensive experience in K-12 education, reporting, and user interaction design. WGen's team specializes in designing innovative solutions to complicated workflow and reporting issues, based on their deep experience working with schools.
- Many of WGen's team members exceed the qualifications of the roles to which they are compared. WGen's architects have an average of 15 years of experience (minimum of 12). 73% of its architects have four or more years of experience beyond college; 41% have an advanced degree.
- Finally, another testimony to the quality of the team is the fact that the Gates Foundation has also selected WGen to build its national Shared Learning Infrastructure (SLI).

In summary, although the rate comparisons provide a complicated picture, our conclusion is that WGen is a highly specialized K-12 educational company that is uniquely qualified to meet our complex deliverable standards and challenging timelines. WGen's proposed rates fall an average of 24% below the comparable OGS not-to-exceed rates and an average of 6.8% below the maximum rates cited in the Gartner survey.

Summary of Cost Justification

NYSED believes that the proposed contract meets the high standard for a single-source cost justification due to the rigorous nature of our estimation of effort and WGen's general alignment with industry standard expense rates, especially given its quality differential and extensive experience in K-12 education.

Finally, NYSED does not believe there is any project in the nation that has or will provide this degree of a tangible asset (a wholly open and non-proprietary software system), along with a specific and actionable plan for knowledge transfer to allow for future self-sufficient operation and development, at an average annualized cost of approximately $2.56 per student (or $26.9 MM for 3 MM students over 42 months).

Project Monitoring:

NYSED will implement project management methodologies to ensure the successful implementation of this initiative. A full-time project manager will be assigned and responsible for but not limited to the following activities:

- Monitor and control the contract costs;
- Review and monitor the schedule;
- Ensure that work is performed within the contracted scope;
- Ensure compliance with contract terms and conditions;
- Facilitate internal decision making to adhere to time lines;
- Schedule and facilitate bi-weekly status meetings; and
- Schedule and facilitate monthly check-point meetings with executive management.

In addition, NYSED will implement an Independent Verification and Validation (IV&V) vendor as part of its quality assurance and risk management plan. IV&V will provide an objective process to ensure that the overall project and each deliverable meet specifications and fulfill the intended business requirement.

If you require any additional information, please don't hesitate to contact me at 402-5388 or via e-mail at wartini@mail.nysed.gov.

Thank you for your assistance.

Exhibit A: NYSED EDP (SLI) Budget Summary

Domain	Description		Estimate
EDP+SLI Data platform	SLI Data Model extensions for NYC/NYS, design, validation		$ 1,061,000
	Sample data, automation, integration tests, handling of bulk exports for NYS extensions; support for NYS integration with SLI		$ 2,675,000
	Additional support for local assessments (fixed budget in SOW)		$ 472,500
	Support for PARCC Data and views		$ 1,013,975
		Subtotal	$ 5,222,475
		Subtotal after discount	**$ 4,804,677**
NYSED Portal	Portal UI, nav, landing (NYSED-specific, separate from SLI)		$ 643,250
	Integration with State Identity Management system and SLI SSO, roles validations, permissions		$ 1,475,000
		Subtotal	$ 2,118,250
		Subtotal after discount	**$ 1,948,790**
Connect API	API functionality - Connect index (separate from SLI)		$ 391,100
	Connect API web service and access control layer (separate from SLI)		$ 475,000
	Metering and sandbox (relying on SLI Key management and admin app)		$ 850,000
		Subtotal	$ 1,716,100
		Subtotal after discount	**$ 1,578,812**
Connect App	Transfer of NYC Connect functionality		$ 1,238,450
	Improvements, Drupal upgrade		$ 1,570,000
	Data integration with SLI		$ 270,000
		Subtotal	$ 3,078,450
		Subtotal after discount	**$ 2,832,174**
Views App	Extension of SLI Views app to NYS elements		$ 1,920,000
	Extension of SLI Views app to NYC elements and ARIS functionality		$ 2,880,000
	New views (e.g., Matrix, aggregate lists)		$ 1,620,000
		Subtotal	$ 6,420,000
		Subtotal after discount	**$ 5,906,400**
Parent Link App	Transfer of NYC functionality, NYC/ROS switch (Based on NYSED Views app); integration with SLI		$ 1,695,000
		Subtotal	$ 1,695,000
		Subtotal after discount	**$ 1,559,400**
Infrastructure Setup	Specification for NYSED		$ 129,400
	Prod, UAT & dev deployment (OS, Software)		$ 425,000
	Prod, UAT & dev deployment (Hardware, Core networking, security)		$ 144,600
	Integration, Automation/Management tools, Runbooks, transition to other vendor		$ 1,380,000
		Subtotal	$ 2,079,000
		Subtotal after discount	**$ 1,912,680**
Tech Operations	18 months (from release alpha), operation of all layers above hosting facility		$ 1,800,000
		Subtotal	$ 1,800,000
		Subtotal after discount	**$ 1,656,000**
Software Maintenance	24 months (from release 1.0), software maintenance team (Connect, Portal, 50% of Data Int)		$ 2,190,275
	18 months (from release 1.5), software maintenance team (remaining components)		$ 2,913,600
		Subtotal	$ 5,103,875
		Subtotal after discount	**$ 4,695,565**
		Grand Total	$ 29,233,150
		Grand Total after discount	**$ 26,894,498**

Exhibit C - WGen Rates Comparison							Analysis							
Wireless Generation Title	OGS Mapping	Gartner Mapping	Total Hours	WGen rate per hour	WGen 8% Discounted Rate	Total Estimated Cost with Discount	Average Existing State Contracts and Field Knowledge[1]		OGS[2]		Gartner[3]			
							Average	% Above Average	Average	% Above Average	Average	% Above Average	Max	% Above Maximum
Senior Executive	Project Manager III		448	$350	$322	$144,256	$318	1%						
Senior Business Analyst	Programmer/Analyst III	Business Analyst D	2325	$300	$276	$641,700	$236	17%	$308	-10%	$127	117%	$288	-4%
Business Analyst	Programmer/Analyst II	Business Analyst C	4115	$250	$230	$946,450	$188	23%	$282	-18%	$120	92%	$201	14%
Senior Architect	Project Manager III	Enterprise Architect D	5189	$300	$276	$1,432,164	$246	12%	$308	-10%	$139	99%	$299	-8%
Architect	Programmer/Analyst III	Enterprise Architect C	12191	$250	$230	$2,803,930	$192	20%	$282	-18%	$131	76%	$201	14%
Developer	Programmer/Analyst II	Web Application Programmer D	45520	$200	$184	$8,375,680	$156	18%	$226	-19%	$132	39%	$207	-11%
Quality Assurance Engineer	Specialist II	Quality Assurance Analyst D	24141	$175	$161	$3,886,701	$170	-5%			$97	66%	$153	5%
Project Manager	Project Manager II	Project Manager D	12644	$225	$207	$2,617,308	$239	-13%	$360	-42%	$154	34%	$310	-33%
Associate Project	Project Manager I	Project Manager C	11052	$175	$161	$1,779,372	$168	-4%	$326	-51%	$130	24%	$230	-30%
IT Engineer	Specialist II	Network Engineer D	15680	$200	$184	$2,885,120	$174	6%			$117	57%	$201	-8%
Art Director	N/A		388	$250	$230	$89,240	$104	121%						
Usability Engineer	N/A		1599	$200	$184	$294,216								
Visual Designer	N/A		1641	$175	$161	$264,201	$115	40%						
External Experts	N/A		3192	$250	$230	$734,160								
					Total Cost	$26,894,498								
Sources														
[1] Seven Contracts were reviewed and rate card information was analyzed														
[2] NYS OGS Contract Consulting Price Lists, Do Not Exceed Rate														
[3] Results of a 2010 Gartner Survey, Gartner Average includes a NYC 15% Differential														