



COMMONWEALTH of VIRGINIA

Office of the Governor

James Duffey
Secretary of Technology

July 1, 2013

The Honorable Robert F. McDonnell
Governor of Virginia
Patrick Henry Building, 3rd Floor
1111 East Broad Street
Richmond, Virginia 23219

The Honorable Walter A. Stosch
Chair, Senate Finance Committee
Senate of Virginia
4551 Cox Road, Suite 110
Glen Allen, Virginia 23060-6740

The Honorable Lacey E. Putney
Chair, House Appropriations Committee
Virginia House of Delegates
Post Office Box 127
Bedford, Virginia 24523

Dear Governor McDonnell, Chairman Stosch, and Chairman Putney:

I am pleased to submit the *Commonwealth Data Standardization: Final Plan*, which is required by Item 427 of the 2012 and 2013 Appropriation Acts. As you know, Item 427 directs the Secretary of Technology to communicate a final plan for data standardization, by July 1, 2013, to the Governor and the Chairmen of the House Committee on Appropriations and the Senate Committee on Finance.

As outlined in the plan, the Virginia Information Technology Agency (VITA) assessed several potential means of data standardization. The plan recommends that systems exchanging "citizen-centric" (Person) data conform with the National Information Exchange Model (NIEM). Migration to NIEM data exchange standards will align the Commonwealth with industry best practices, federal requirements, and existing data standards, and thereby achieve the stated requirements of Item 427. For other types of data, VITA will support agencies in identifying and implementing applicable national and international standards.

As part of a compliance strategy to be implemented in Fiscal Year 2014, VITA staff will ensure all information technology projects comply with applicable standards, or have an approved exception, by the time the system goes into production. As the number of agencies using NIEM-conformant exchanges for Person data increases, the average implementation cost per system is projected to be approximately \$173,890. This cost will decrease as additional projects adopt and reuse the NIEM Information Exchange Package and Documentation.

Thank you very much for your time and consideration. Please contact me if you have any questions or concerns.

Sincerely,

A handwritten signature in black ink, appearing to read "James D. Duffey, Jr.", written over a light blue circular stamp.

James D. Duffey, Jr., Secretary of Technology

Enclosures

c: The Honorable Martin Kent, Chief of Staff

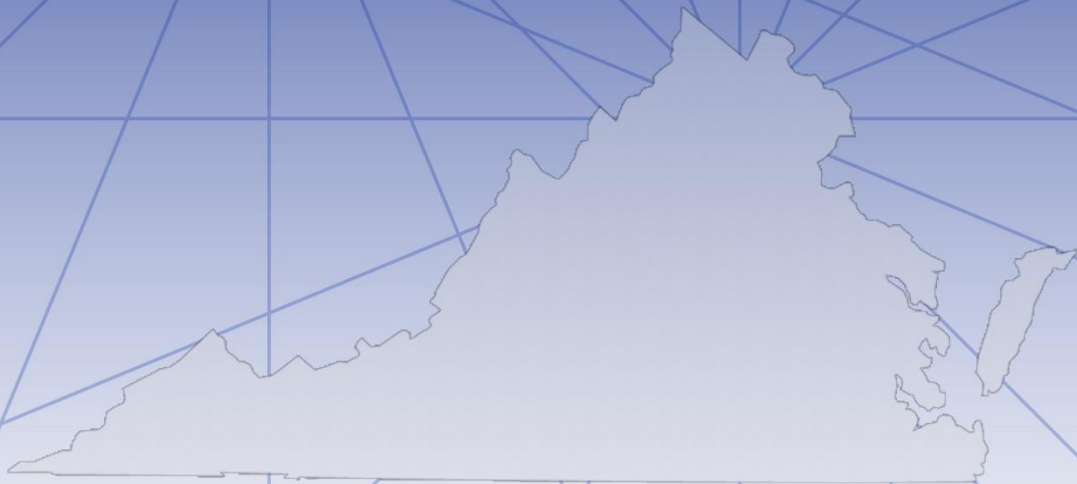
Virginia Information Technologies Agency



Commonwealth Data Standardization: Final Plan

*Reported Pursuant to Item 427 of the
2012 Appropriation Act*

Virginia Information Technologies Agency



July 1, 2013

www.vita.virginia.gov

Executive Summary

Item 427 C of the 2012 and 2013 Appropriation Acts (Item 427) requires the Secretary of Technology to develop data standards for information commonly used by state agencies. (This requirement builds upon similar directives in Item 460 of the 2008 Appropriation Act and § 2.2-1115.1 of the *Code of Virginia*.) The current report constitutes the Secretary of Technology's final submission to the General Assembly in response to the Item 427 requirements. The report has been prepared by the Virginia Information Technologies Agency (VITA), on behalf of the Secretary of Technology.

Progress on Data Standardization and Governance

- To date, the Secretary of Technology has approved data standards for three of the seven business areas cited in the 2008 Appropriation Act, including the Chart of Accounts Data Standard.
- VITA is also working with the Department of Planning and Budget to develop the Agency Identification Data Standard, which will be the fourth of the seven business areas cited in the 2008 Appropriation Act.
- Since last year's publication of the *Commonwealth Data Standardization: Interim Plan*, VITA has completed an eight-month planning process to develop the Commonwealth's Enterprise Information Architecture (EIA) Strategy.

Alternatives for Standardized Data

- To meet the requirements of Item 427, VITA staff examined several alternatives for implementing standardized data:
 - First, VITA staff explored the two primary methods for data standardization: data standards and data exchange standards.
 - Second, VITA staff explored whether Web services, and services offered in VITA's Services Oriented Architecture (SOA) environment, may be viable alternative means of standardizing data instead of using data standards.
 - Third, VITA staff examined whether the Enterprise Data Management (EDM) solution could standardize data through the use of a shared services platform rather than through data standards

Item 427 C.1 Element

- Item 427 C.1 requires the Secretary of Technology to develop Commonwealth data standards for "Person" data (citizen-centric data, personnel, recipient information), and other common sources of information.
- In compliance with Item 427 C.1, VITA worked with other state agencies to develop a strategy for standardizing the types of data outlined in the Item.
- A core element of the implementation strategy for Person data involves migrating systems which do not already use adopted Person data standards into conformance with the National Information Exchange Model (NIEM). Migration to NIEM and other nationally-recognized standards will align the Commonwealth with industry best practices, federal standards, and existing data standards.

- As required by Item 427, VITA staff estimated the per-system cost of data standardization. Using the NIEM Cost Model, as the number of agencies using NIEM-conformant exchanges increases, the average implementation cost per system is projected to be approximately \$173,890.
- Adoption of NIEM as a central part of compliance with Item 427 C.1 will achieve the business objectives of standardizing Person data while maximizing cost efficiency for onboarded systems.

Item 427 C.2 Element

- Item 427 C.2 requires the Secretary of Technology to:
 - Determine if standardized data, as used by systems currently in development, should be more broadly adopted as Commonwealth data standards; and
 - Ensure that systems currently in development comply with data standards, including those identified in response to the requirements of Item 427 C.1 and C.2.
- VITA worked with Commonwealth agencies to develop an Item 427 C.2 compliance strategy. The strategy involves coordination between VITA's Commonwealth Data Governance (CDG), IT Investment Management Division (ITIMD) and Project Management Division (PMD) staff to evaluate whether a system's use of standardized data should be adopted as a new Commonwealth standard, or if a system should use other data standards.
- VITA staff did not identify any current use of standardized data that merits adoption as a Commonwealth data standard. This approach would move the Commonwealth away from compliance with industry best practices, federal standards, and existing data standards.
- However, VITA staff identified certain projects cited in Item 427 as candidates for adoption of existing data and data exchange standards:
 - Person data (Item 427 C.1) Data: 26 Projects
 - Other Data Standards: 7 additional Projects
- Projects determined by VITA CDG staff as needing to adopt data standards will continue to be monitored throughout their lifecycle to ensure compliance with data standards.

Governance Model

- As indicated by the participation of more than 30 agencies, VITA has established a process model that supports the business objectives of data standardization.
- VITA recommends that each Commonwealth Executive Branch agency designate a data steward who will serve as the agency's lead point of contact on data governance and related Enterprise Information Architecture issues. VITA will work with agencies to establish formal roles for data stewards as part of a business-driven, enterprise data governance function.

Background and Statutory Requirements

Item 427 C of the 2012 and 2013 Appropriation Acts ("Item 427") requires the Secretary of Technology to identify, develop, and adopt data standards. This report constitutes the final plan for data standardization, as required by Item 427, which the Virginia Information Technologies Agency (VITA) has prepared on behalf of the Secretary of Technology.

Because the requirements in Item 427 build upon similar directives in Item 460 of the 2008 Appropriation Act and § 2.2-1115.1 of the *Code of Virginia*, this report also recommends how the data standardization efforts required by each of these statutes should be addressed. As discussed below, VITA has assessed the degree to which a combination of data standards, data exchange standards, Web services and other alternatives may be used to achieve the statutory requirements for implementing standardized data.

Since publication of the *Commonwealth Data Standardization: Interim Plan*¹ in November 2012, VITA has created a new process model for development of data standards.

VITA's Process Model for Data Standardization

From August-November 2012, VITA engaged with the Department of Accounts (DOA) and the Cardinal team to implement the new process model for development of the Chart of Accounts Data Standard. The adopted standard, which received final approval by the Secretary of Technology on January 24, 2013, leveraged DOA's expertise with regard to financial accounting and control and the State Comptroller's statutory authority to "direct the development of a modern, effective, and uniform system of bookkeeping and accounting" and ensure it is adopted by state agencies (§2.2-803). In keeping with the new process model, VITA prepared the data standard's documentation and managed the public comment and adoption phases, thus reducing the burden on DOA and expediting the standard's adoption.

To support this new process, this report proposes a new governance model that will meet the requirements in both Items. VITA's recommended governance model acknowledges the role of the Secretary of Technology, who is statutorily designated as the Commonwealth's Chief Applications Officer, or CAO (Chapters 136 and 145 of the 2010 *Acts of Assembly*).

¹ The *Commonwealth Data Standardization: Interim Plan* may be accessed at <http://www.vita.virginia.gov/oversight/DM/default.aspx?id=6442470861>

Progress on Data Standardization and Governance

To date, the Secretary of Technology has adopted data standards for three of the seven business areas cited in the 2008 Appropriation Act. The 2008 Appropriation Act directed the Departments of General Services (DGS), Treasury, Human Resource Management, Planning and Budget (DPB), and Accounts (DOA) to provide the Director of the Virginia Enterprise Applications Program (who served as CAO) with certain data standards by October 1, 2008. That date was extended to July 1, 2010 by the 2010 Appropriation Act, by which time the Secretary of Technology had been statutorily designated as the CAO. The Acts outlined seven business areas for which data standards were required:

- Vendor tables
- Receiving information
- Invoice information
- Purchase information including commodity codes
- Agency identification information
- Chart of Accounts
- State employee identification information

A similar requirement to adopt certain data standards was codified in 2009 by § 2.2-1115.1 of the *Code of Virginia*. This section requires DGS, VITA, and DOA to develop those data standards “necessary to appropriately and consistently identify all suppliers of goods, commodities, and other services to the Commonwealth.”

Since submission of the Item 427 *Interim Plan* in November 2012, the Chart of Accounts data standard has been adopted by the Secretary of Technology. This standard joins two others which have already been adopted, the Procurement Vendor and Employee Identification Standards. In addition, VITA is also working with DPB to develop the Agency Identification Data Standard, which will address the fourth of the seven business areas cited in the 2008 Appropriation Act.

Data standards for the remaining three business areas cannot be developed or adopted until the Commonwealth finalizes the state procurement process. The Commonwealth is currently reviewing the extent to which the procure-to-pay process should use the eVA system maintained by DGS or the Cardinal system maintained by DOA. Until this determination is made, and the resulting procure-to-pay process is finalized, it is not possible to assess the extent and nature of data standardization that will be required for the three remaining business areas: receiving, invoicing, and purchasing. However, as discussed below, once this determination is made the statutory requirements to ensure consistent use of standardized data can be met by using a combination of data exchange standards and other services.

Since publication of the Interim Plan, VITA has also completed an eight-month planning process to develop the Commonwealth’s Enterprise Information Architecture (EIA) Strategy. This overhaul of the EIA governance and oversight framework has been led by the Commonwealth Data Governance

(CDG) team, which is part of VITA's Enterprise Solutions and Governance Directorate.

The new EIA Strategy articulates a strategic vision supported by measurable goals and objectives in the primary EIA program areas. VITA focused the plan on addressing key business drivers for information management, including the need for high-quality and timely information; the ability to share information across agency data systems; the assurance of security, privacy and confidentiality; and a greater return on investment for information assets. The adopted plan will be used for the Commonwealth to track its progress toward the desired EIA "future state" through the 2020 planning horizon.

Commonwealth EIA Strategy 2014-2020

*From September 2012-May 2013, VITA completed an intensive planning process to develop a Commonwealth EIA Strategy. The process began with the EIA Scorecard, an enterprise-wide survey of data stewards and other stakeholders, to assess the "current state" of EIA. VITA then collaborated with agency representatives from across the Commonwealth through a series of stakeholder engagement sessions to develop the EIA strategic plan. At the time of this report, the final EIA plan has been completed and submitted to the Secretary of Technology for adoption (See **Appendix 1.**)*

VITA recognizes that significant work remains to achieve the business objectives of data standardization, and has integrated into the Commonwealth EIA Strategy the goal of achieving all of the data standardization requirements in both the 2008 and 2012 Appropriation Acts, and § 2.2-1115.1 of the *Code of Virginia*.

Alternatives to Use of Standardized Data

To meet the requirements of Item 427, VITA examined several alternatives to the use of standardized data.

First, VITA explored the two primary methods for data standardization: data standards and data exchange standards. Both types of data standards establish agreements on data elements, definitions and specifications for enterprise data, but they differ in how standardization is accomplished.

- Data standards define the structure of data at rest within a system, but their adoption would require agencies to modify their existing systems and commercial-off-the-shelf (COTS) solutions.
- In contrast, data exchange standards define how data are transformed during data extraction and sharing between systems. The use of data exchange standards thereby lowers costs and the compliance burden by only requiring agencies to implement compliant information exchanges.

NIEM Data Exchange Standards

A key lesson from the September 11 terrorist attacks involved the need for intelligence services, law enforcement and emergency management to be able to share information more effectively. In response, the U.S. Department of Justice worked with other federal agencies and state law enforcement to develop the National Information Exchange Model (NIEM), a set of data exchange standards and schemas designed to support enterprise information sharing regardless of how source systems stored data at rest. The result has been stable, scalable interfaces across domains and levels of government. For more information, visit www.niem.gov.

Second, VITA explored the use of Web services and the services offered in VITA's Services Oriented Architecture (SOA) environment. Web and SOA services enforce the use of standardized data (shared meanings, vocabularies, and data elements) by publishing data through a standardized Web-based interface. By using Web and SOA services, agencies would no longer have to store their own data but could instead design their applications and solutions to "call" data that are published via a Web or SOA service. The use of Web or SOA services therefore enforces the use of standardized data across those systems that consume the service.

Moreover, use of Web and SOA services reduces storage of redundant data, and also ensures that the data are the most up to date, since the Web and SOA services are maintained by the data-owning agency. Web and SOA Services also support a more seamless and effective mechanism for transforming data, compared to traditional methods, which enables the standardization of data through the Web and SOA exchanges.

Use of SOA to Share Children’s Electronic Health Records

The U.S. Department of Health and Human Services recently released new format requirements for children’s Electronic Health Records (EHRs). Commonwealth agencies recognized that the sharing of the new EHRs among providers, labs and health systems would be far more efficient by using SOA services rather than point-to-point messaging. SOA enables messages to be published and accessed automatically by subscribers to the services, rather than depending on a receiver’s system to be available for a point-to-point message to arrive. VITA will support this effort by developing the new EHR requirements as Commonwealth standards.

Third, VITA assessed how the Enterprise Data Management (EDM) solution could standardize data through the use of a shared services platform rather than through data standards.

VITA’s new EDM solution features data “hubs” that maintain matched sets of records from agency source systems; the current hubs within EDM are for person and organizational data. Agencies that use EDM would be able to reuse core data elements for person and organization data, which would enforce standardization because the core data elements will use the adopted EDM Person Data Exchange Standard and the forthcoming EDM General Organization Data Exchange Standard.

Potential to Ensure Use of Standardized Vendor Data via EDM

Commonwealth agencies continue to seek a viable solution for fully implementing the adopted Procurement Vendor Data Standard. Vendor data from different agencies could be maintained in the EDM Organization Hub. EDM could then match these data and thereby indicate when different agencies refer to the same vendor by different names. These matches could be provided to the Department of General Services (DGS), which could use them to update and maintain their vendor data. DGS could then use SOA to provide regular vendor data updates to each agency via a Web service. This would achieve the business objective for standardized data by implementing the standard in the EDM solution and using SOA to publish the consistent, standardized data for agency use.

Item 427 C.1 Element

"...the Secretary of Technology shall work with all Cabinet Secretaries and their agencies to develop Commonwealth data standards for citizen-centric data, personnel, recipient information, and other common sources of information gathered by the Commonwealth and in use by systems set out within this item.... In developing the plan, the Secretary of Technology shall use best practices, federal requirements, and existing data standards."

Item 427 C.1
2012 Appropriation Act

On behalf of the Secretary of Technology, VITA worked with state agencies to develop a strategy for standardizing the types of data outlined in the Item. Item 427 C.1 requires the Secretary of Technology to develop standards for "Person" data (which was defined by Item 427 as citizen-centric data, personnel, recipient information), and other common sources of person information. Because Item 427 focused on the use of these standards by the projects cited in the Item, each of these 45 projects or systems could potentially be considered "in-scope" for the required data standardization efforts. The systems cited in Item 427 represent nine Secretariats, and are designed to implement a wide variety of business functions. The estimated cost of these projects ranges from \$1 million to \$114 million, with an average cost of \$11.3 million.

A core element of VITA's recommended implementation strategy for Person data involves migrating systems into conformance with the National Information Exchange Model (NIEM). Item 427 also focuses on the use of Person data by state agencies, and at the federal level exchanges of Person data increasingly comply with NIEM standards. NIEM has been endorsed by the National Association of State Chief Information Officers (NASCIO) as the set of standards and governance structure for agencies at all levels of government to adopt when exchanging Person data. (NIEM is discussed in more detail in the Interim Report.) VITA recommends that NIEM compliance be required of all projects that do not already incorporate adopted Person data standards.

Migration to NIEM standards will align the Commonwealth with industry best practices, federal requirements, and existing data standards, and thereby achieve the requirements of Item 427 C.1. Federal agencies increasingly require NIEM-conformant solutions and information exchanges as part of their funding programs in order to facilitate performance reporting. In addition, adoption of NIEM is cost-efficient because it will allow Commonwealth agencies to meet federal and state data-standardization requirements without having to modify the underlying data architecture of existing systems.

The first step in migrating Commonwealth agencies toward conformance with NIEM has been VITA's development of the NIEM Core Person Data Exchange Standard ("NIEM Person Standard"). This standard was submitted for review by state agencies in April 2013, and transmitted to the Secretary of Technology for review and approval in May 2013.

The basis of NIEM involves a “data exchange” between participating agencies. In NIEM terminology, a “data exchange” refers to an Information Exchange Package (IEP), a description of specific information exchanged between a sender and a receiver. The IEP can be coupled with additional documentation, sample Extensible Markup Language (XML) instances, business rules, and other elements to compose an Information Exchange Package Documentation (IEPD). Accordingly, the new NIEM Person Standard will be accomplished by mapping core data elements in all newly-proposed and in-scope systems to NIEM data exchange standards. This will allow incorporation of a NIEM-conformant Information Exchange Package (IEP) and supporting IEP Documentation (IEPD). More detailed information on the NIEM Person Standard and the implementation plan has been provided in **Appendix 2**.

A. IMPLEMENTATION STRATEGY

VITA’s implementation strategy for the Item 427 requirements for Person data is based upon adoption of the NIEM Person Standard. The standard will apply to all Person data exchanged by Commonwealth agencies.

Standardization of other common sources of information will occur through the adoption of other nationally-recognized standards, such as HL7, and Commonwealth standards such as the newly-adopted Chart of Accounts Standard. The implementation strategy for these standards is discussed below, as part of the response to Item 427 C.2.

B. SCOPE

Systems listed in Item 427 that use Person data, and all newly-proposed information systems, will be required to adopt the NIEM Person Standard. The term “system” refers to database solutions, Web services, message handlers and other platforms, applications, solutions and services that support the exchange of Person data.

VITA shall be responsible for determining whether a system will be considered in-scope for the NIEM Person Standard. VITA will base its scope determination on whether the system will exchange Person data with systems outside of the agency implementing the system. The scope review will be applicable only to major IT projects subject to VITA/Project Management Division (PMD) review. Non-major projects or modifications to existing systems outside of the VITA/PMD review will not be subject to the VITA scope review for the NIEM Person Standard. Likewise, systems that do not exchange data (“stand-alone”) or exchange only within the agency shall not be in scope for the standard.

The scope of NIEM Person Standard will include:

- **Item 427 Systems:** Agencies with systems cited in Item 427 of the 2012 Appropriation Act (“Item 427 systems”), and which are still under development as of July 1, 2013, will need to prepare for compliance with the NIEM Person Standard. Accordingly, agencies with systems listed in Item 427 will be required to submit a plan for compliance with the NIEM Person

Standard or else obtain an approved Commonwealth Enterprise Architecture exception. The compliance plan must be submitted to VITA by July 1, 2014 and include a cost estimate and project schedule.

- **New Systems:** Beginning on July 1, 2013, any new system subject to review by VITA’s Project Management Division, including systems cited in Item 427 of the 2013 Appropriation Act, will be required to either (a) comply with the NIEM Person Standard at the time the system goes into production or (b) obtain a Commonwealth Enterprise Architecture exception. Unless an exception is granted by VITA, the NIEM Person Standard will require an agency to ensure its project documentation demonstrates how the system will implement a NIEM-conformant IEPD.

C. COST ESTIMATION MODEL

To meet the requirements of Item 427, VITA staff used the NIEM Cost Model to estimate the cost required to implement NIEM-conformant exchanges. The NIEM Program Management Office in the United States Department of Homeland Security developed the NIEM Cost Model to calculate cost estimates for the IEPD Lifecycle, from initial development of a NIEM IEPD to implementation of the NIEM exchange.

Input values for VITA’s use of the model were derived from the level of effort required to develop a NIEM-conformant IEPD for the EDM platform, which involves the exchange of information across two pilot source systems. VITA staff used the level of effort for this pilot implementation to project the number of times that the initial EDM Person IEPD would be reused by different systems.

Since the Commonwealth does not currently have an enterprise-level NIEM-conformant information exchange, VITA generated three runs of the NIEM Cost Model; each run assumed varying levels of acceptance and IEPD reuse (number of systems onboarded in Year 1 through Year 4 of implementation). Each model assumed use of the two EDM pilot systems in Year 1, but varied on levels of IEPD reuse (low, medium and high) in the out years. A summary of the findings from the NIEM Cost Model estimation for each scenario has been provided in **Figure 1**. The full cost model analysis is shown in **Appendix 3**.

Figure 1. NIEM Cost Model Results

NIEM IEPD Acceptance/ Reuse (A/R)	Cost of NIEM Conformant Exchange (Number of Systems Onboarded)			
	Base Year	Year 1	Year 2	Year 3
Low A/R Scenario	\$682,535 (2)	\$345,016 (2)	\$345,016 (2)	\$345,016 (2)
Medium A/R Scenario	\$682,535 (2)	\$516,141 (3)	\$687,267 (4)	\$858,392 (5)
High A/R Scenario	\$682,535 (2)	\$687,267 (4)	\$1,029,518 (6)	\$1,371,769 (8)

The per-system cost for implementing the NIEM IEPD is projected to decline through the Year 3 timeframe. The summary in Figure 1 includes the estimated cost for initial IEPD development (Base Year) and the out-year estimates for each of the three scenarios. As Figure 1 shows, the initial IEPD development estimate was \$682,535 for the two pilot systems. Over time, the cost per-system is projected to decline based on IEPD reuse and staff expertise. As shown in the year 3 column, under the medium acceptance and reuse scenario (in which five systems use the IEPD), the average implementation cost per system is \$173,890.

Adoption of NIEM as a central part of the Commonwealth Item 427 C.1 compliance strategy will achieve the business objectives of standardizing Person data while maximizing efficiency for onboarded systems. The results from the NIEM Cost Model demonstrate a key element in the NIEM value proposition. Development of a NIEM IEPD requires a substantial initial investment, but the projected cost of onboarding new systems to the NIEM exchange will decline over time based on IEPD reuse.

Virginia Leads the Nation in Using the NIEM Cost Model

VITA's implementation of the NIEM Cost Model represented the first time a state government had used the model for the purpose of enterprise-wide conformance with NIEM. VITA staff participated in the 2013 NIEM Town Hall Meeting to discuss the Commonwealth's NIEM strategy. In April 2103, the NIEM Program Management Office in the U.S. Department of Homeland Security conducted a peer review of VITA's cost models and found them to be fully consistent, valid and reliable.

D. SCHEDULE

As required by Item 427, VITA staff developed the NIEM Project Schedule based on best practices published in the Guide to the Project Management Body of Knowledge (Project Management Institute, 5th Edition, 2013). The NIEM Project Schedule presents in a standard Gantt chart format the phases, tasks and subtasks that comprise the NIEM IEPD Lifecycle. The full Gantt chart for the NIEM Project Schedule has been provided in **Appendix 4**, with an overview in **Figure 2**.

The NIEM Project Schedule has been prepared to align with the cost estimates generated using the NIEM Cost Model. This will give policymakers and Commonwealth agencies a more complete understanding of the resource allocations needed for the design, development, testing, and implementation of a NIEM-conformant information exchange.

Figure 2. NIEM Project Schedule Summary

NIEM IEPD Lifecycle Phase	Timeframe
Scenario Planning	40 days
Requirements Analysis	30 days
Mapping and Modeling	30 days
Building and Validating	60 days
Assemble and Document	20 days
Publish IEPD	10 days
Data Exchange Design Implementation	65 days
Data Exchange Development and Implementation	30 days
Data Exchange Testing	60 days
Data Exchange Deployment	30 days
Total	375 days

The NIEM Project Schedule also gave VITA staff valuable insights for developing a strategy and schedule for forthcoming Commonwealth NIEM data exchange standards. For the purpose of the EDM Person Exchange Project Schedule, VITA staff used the highest end of the scale for resource allocations under the Level of Effort variable in the NIEM Cost Model. Framing the Project Schedule based on the highest end of the resource allocation scale enabled VITA staff to estimate the longest reasonable timeframe required for development, testing and deployment of the NIEM IEPD for the EDM Person Exchange.

The NIEM Project Schedule shows that the total time to develop the initial NIEM-conformant IEPD is projected to be 375 days. Once the initial IEPD has been developed, tested and deployed, the projected time required to onboard new systems to the NIEM exchange should decline from the initial level.

Item 427 C.2 Element

"Where active projects in this item have implemented standardized data, the Secretary of Technology shall work with all Cabinet Secretaries and their agencies to determine if these standards should be adopted as Commonwealth data standards for use in active or future major IT projects or investments. Where active projects in this item do not conform to the Commonwealth's data standard, the Secretary of Technology shall include in the interim a plan for how the Secretary of Technology will identify data standards that should be adopted as Commonwealth data standards..."

Item 427 C.2
2012 Appropriation Act

On behalf of the Secretary of Technology, VITA worked with state agencies to develop a compliance strategy for Item 427 C.2. This strategy includes (1) a determination of which approaches to standardized data implemented by projects cited in the Item should be considered for adoption as Commonwealth standards and (2) a method to ensure that the projects cited in the Item comply with the NIEM Person Standard and other standards, as appropriate.

VITA's Item 427 C.2 compliance strategy involves coordination between VITA Commonwealth Data Governance (CDG), IT Investment Management Division (ITIMD) and Program Management Division (PMD) staff. Projects cited in the Item ("in-scope systems") were reviewed by ITIMD and PMD staff to assess whether the data managed in the system should be considered for potential adoption as a new data standard or should comply with an existing Commonwealth data standard. In-scope systems first underwent a full review by CDG staff to identify which systems use standardized data. Those in-scope systems which use standardized data were then evaluated by CDG staff to determine which approaches to standardized data may be candidates for adoption as Commonwealth standards. As part of the ongoing compliance strategy for future projects, VITA's CDG staff will now work with VITA's PMD staff to review all projects throughout the PMD project oversight lifecycle.

VITA's New System Review for Compliance

The Department of Behavioral Health and Developmental Services (DBHDS) recently completed the procurement process for a new Electronic Health Record (EHR) system for the agency's health facilities, which is one of the projects cited in Item 427. VITA CDG and PMD staff worked closely with DBHDS staff to review the vendor proposals and confirm that the new EHR system will comply with applicable health IT standards. This implementation of the new VITA project review process resulted in the selection of a compliant system and will enhance interoperability between DBHDS and the Commonwealth's other health IT systems.

The new process model has been implemented by CDG staff. For in-scope systems, CDG staff has implemented the new process model for identifying potential standards and recommending them to the Secretary of Technology for adoption. The process model includes the following primary steps:

- Research support: Provide research support to identify and harmonize proposed standards with existing standards or services.
- Stakeholder engagement: Facilitate stakeholder workshop(s) to gather input from Commonwealth agency data stewards.
- Health Information Technology Standards Advisory Council (HITSAC) review/public comment: Compile the business narrative, data dictionary and other support documentation for HITSAC review, if required, and public comment on VITA's Online Review and Comment Application.
- Decision package and adoption: Revise the data standard documentation based on HITSAC or public comments, and prepare decision package for review and approval by the Chief Information Officer of the Commonwealth and the Secretary of Technology.
- Enterprise Architecture (EA) Data Standards Repository: Upon adoption by the Secretary of Technology, publish the standard in the EA Data Standards Repository. Conduct quarterly reviews of adopted standards to ensure currency.

New process model has supported the completion of three standards since publication of the Commonwealth Data Standardization: Interim Plan in November 2012. This includes two standards that address business areas cited for standards in the 2008 Appropriation Act: Chart of Accounts Data Standard, developed by VITA CDG staff in conjunction with the Department of Accounts and the Cardinal team, and the Agency Identification Information Data Standard, developed by VITA CDG and the Department of Planning and Budget. The third standard was the Check Printing Data Standard, developed by VITA CDG in partnership with Department of Treasury.

A. IMPLEMENTATION STRATEGY

VITA has developed an implementation strategy for Commonwealth standards adopted from projects cited in the Item, consistent with the strategy defined above in this report. The implementation strategy addresses new information systems and projects cited in the Item:

- **Item 427 Systems:** Agencies with systems cited in Item 427 of the 2012 Appropriation Act ("Item 427 systems"), and which are still under development as of July 1, 2013, will need to prepare for compliance with applicable standards. Agencies responsible for systems listed in Item 427 will be required to submit to VITA a plan for compliance with applicable standards or have an approved Commonwealth Enterprise Architecture

exception; the plan or approved exception must be submitted by July 1, 2014.

- **New Systems:** Beginning on July 1, 2013, any new system subject to review by VITA's Project Management Division, including systems cited in Item 427 of the 2013 Appropriation Act, will be required to comply with the applicable standards, or have an approved Commonwealth Enterprise Architecture exception, by the time the system goes into production. Compliance with applicable standards or documentation of an Enterprise Architecture exception will be required for project approval.

B. SCOPE

Systems listed in Item 427 that use Person and other structured data, and all newly-proposed information systems, will be required to adopt the NIEM Person Standard or another applicable standard. The term "system" refers to database solutions, Web services, message handlers and other platforms, applications, solutions and services that support the exchange of Person data.

VITA shall be responsible for determining whether a system will be considered in-scope for use of a data standard. VITA will base its scope determination on whether the system will exchange Person or other data with systems outside of the agency implementing the system. The scope review will be applicable to only major IT projects subject to VITA/Project Management Division (PMD) review. Non-major projects or modifications to existing systems outside of the VITA/PMD review will not be subject to the VITA scope review. Likewise, systems that do not exchange data ("stand-alone") or exchange only within the agency shall not be in scope for the standard.

Systems cited in the Item were reviewed by VITA's Commonwealth Data Governance (CDG), IT Investment Management Division (ITIMD) and Project Management Division (PMD) staff. Although the 2012 Appropriations Act includes 45 projects, the language in Item 427 directed VITA to focus on "active projects" that have "implemented standardized data." These two factors appropriately limited the scope of VITA's review, which occurred in fall 2012. In some cases, projects listed in Item 427 were no longer active at the time of this review, and had either been completed, suspended, canceled, or closed out. Some other projects, such as the Virginia Department of Transportation's implementation of SharePoint, do not use standardized or structured data.

As a result of these factors, VITA staff identified 36 "candidate" projects which were potentially in-scope for data standardization. These candidate projects were then reviewed more fully to determine whether the systems (a) exchanged Person data with systems outside the host agency, (b) were in scope for an existing standard, and (c) would be a candidate for a Commonwealth standard.

To evaluate whether a project would be considered in-scope, VITA amended its project review process to incorporate measures to be used by ITIMD, PMD and CDG staff for scope determination. VITA has implemented the scope reviews at multiple phases of the project lifecycle: investment business case approval, project initiation, project planning and project approval.

The first step in the scope review was completed by ITIM and PMD staff to determine whether the more in-depth CDG review would be required. Next, CDG staff implemented a full scoping survey to complete the evaluation and make the final scope determination. The full results from the Item 427 scope determination have been provided in **Appendix 5**. Breakouts by Secretariat are shown in **Figure 3**, which also indicates that data in 33 of the 36 candidate projects merited additional review for either potential adoption as a new data standard or should comply with an existing Commonwealth data standard.

As shown in Figure 3, 26 projects should adopt the NIEM Person Standard. The remaining seven projects should adopt other standards, such as the Commonwealth’s adopted health IT standards, such as Health Level 7 (HL7) or other governing health external (national or international) standards for Person data. Other standards that should be adopted also include the Chart of Accounts Data Standard and other standards adopted in response to the requirements of the 2008 Appropriation Act and § 2.2-1115.1 of the *Code of Virginia*.

Figure 3. VITA CDG/PMD Project Analysis Results (as of November 2012)

Secretariat	Number of Item 427 Projects Potentially in Scope for Data Standards (by Category)	
	“Citizen-Centric” Data (Item 427 C.1)	Other Standards (Item 427 C.2)
Administration	1	--
Commerce and Trade	2	1
Education	1	--
Finance	1	2
Health and Human Resources	9	--
Natural Resources	--	1
Public Safety	5	--
Technology	2	--
Transportation	5	3
Total	26	7

VITA staff did not identify any use of standardized data that merits the development of an internal, Commonwealth-centric standard. VITA has designed its approach to data standardization to align with industry best practices, federal standards, and existing data standards, as recommended under Item 427. Consistent with this approach, VITA staff recommend that all projects determined to be in-scope for data standardization implement applicable external (national or international) standards, to the extent feasible and appropriate for the business.

Projects determined by VITA CDG staff to be in-scope for data standardization will be monitored throughout the project lifecycle. VITA CDG staff will evaluate those projects implementing standardized data to determine whether the project's use of standardized data, including standardized means of exchanging data, should be adopted as Commonwealth standards.

VITA CDG staff also will work with agency project managers to identify existing standards and harmonize the project's data standards/data exchange standards/services with applicable standards. If the project's data standards/data exchange standards/services are determined to be appropriate for adoption as a Commonwealth standard, VITA CDG will work with the owners of the standard or service to complete the EIA data standardization process model outlined above in this report.

C. REQUIRED VITA RESOURCES

Additional funding is needed to provide VITA CDG staff support needed to implement the data standardization process model and compliance strategy. VITA CDG has leveraged existing resources from VITA's General Fund budget and program level funding from the Electronic Health and Human Resource (eHHR) Program to build the foundation for the EIA program. However, VITA CDG's support from the eHHR Program will end at the conclusion of the federal funding period. To sustain the effort, VITA will need to replace the eHHR funding with an alternate source.

Presently, VITA has three CDG staff. To sustain data standardization efforts, VITA requires ongoing funding for a VITA CDG Senior Analyst (IT Specialist III) and a Business Analyst (IT Specialist III). Failure to replace the CDG staff positions after the end of the eHHR Program period would reduce the CDG team to a single position, the CDG Service Lead.

Inability to obtain funding for CDG staff would severely diminish CDG's capacity to continue implementing the initiatives identified in this plan and prevent VITA from achieving the objectives of Item 427.

Data Standards Governance Will Be Addressed As Part of Enterprise Information Architecture Strategy

The governance structure developed by VITA to meet the Item 427 requirements represents part of a broader, enterprise governance model that covers the core enterprise information architecture (EIA) areas – data governance, data standards, data asset management and data sharing. This enterprise governance model is being implemented as part of the Commonwealth’s EIA Strategy, which was developed by VITA staff following three stakeholder engagement sessions held from February through April 2013. The final EIA strategy reflects the input of more than 100 data stewards and other stakeholders from across the executive branch.

The Commonwealth’s EIA Strategy itself resides within the Commonwealth’s broader Enterprise Architecture (EA) framework, which is established within VITA’s Information Technology Resource Management (ITRM) Policies, Standards, and Guidelines. The foundation for the EIA Strategy was established in July 2012 when the Secretary of Technology adopted a more robust definition of EIA and an EIA Maturity Model into the [Enterprise Architecture \(EA\) Policy 200-02](#). The Commonwealth’s EIA Strategy has therefore been developed and adopted pursuant to the statutory authority granted to the Secretary of Technology.

VITA has established a process model with Executive Branch agencies designed to support the business objectives of data standardization.

Through the planning effort that produced the Commonwealth EIA Strategy and the new process model for data standardization described above, VITA has increased agency awareness and support for enterprise standards and related data governance activities. Ongoing success of this process model, however, requires adequate CDG staffing at VITA and the support of data stewardship roles at state agencies.

An important step in developing the enterprise governance model will be to establish formal governance roles for agency data stewards. Formalized governance roles will provide a framework through which agencies will implement a business-driven data governance function. This formalization of data governance roles and responsibilities will mark a significant investment toward achieving the Item 427 requirements and the broader vision expressed in the Commonwealth’s EIA Strategy.

VITA will work with agencies to establish formal roles for data stewards integrated with a business-driven, enterprise data governance function.

This formalization of data governance roles and responsibilities has been memorialized in the recently adopted EIA Maturity Model and formally established as part of the goals and objectives of the Commonwealth EIA Strategy.

Formalization of data stewardship has the following benefits:

- Creates a business-driven, enterprise approach to the EIA program areas of data governance, data standards, data asset management and data sharing

- Leverages subject matter expertise across Secretariats and lines of business in state government
- Supports the institutionalization of data governance processes and functions
- Builds implementation and compliance mechanisms that reflect the federated nature of the Commonwealth's Executive Branch

VITA recommends that each Commonwealth Executive Branch agency designate a data steward who will serve as the agency's lead point of contact on data governance and related EIA issues. This could be a role added to the Agency IT Resource (AITR) or some other agency designee. VITA CDG staff then would work directly with the designated agency data steward to design and implement the full enterprise governance model. VITA staff will also assess whether the Commonwealth's EIA policies should be revised to require each agency to designate a data steward.

NASCIO on Business-driven Data Governance

NASCIO has identified business-driven data governance as a key ingredient for enterprise information management:

"Information and data must be viewed at the enterprise level as state government assets that are owned by the business. Data governance is a business concern that can be supported by information technology. It must be viewed as an enterprise asset management program." (NASCIO, Data Governance – Managing Information as an Enterprise Asset, 2008)