



VITA REQUEST FOR INFORMATION (RFI) 2017-14
FOR SERVER, DATA CENTER, AND SECURITY SERVICES
Proposal Response

October 21, 2016



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4. RESPONDENT CONTACT INFORMATION

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5. QUESTIONS

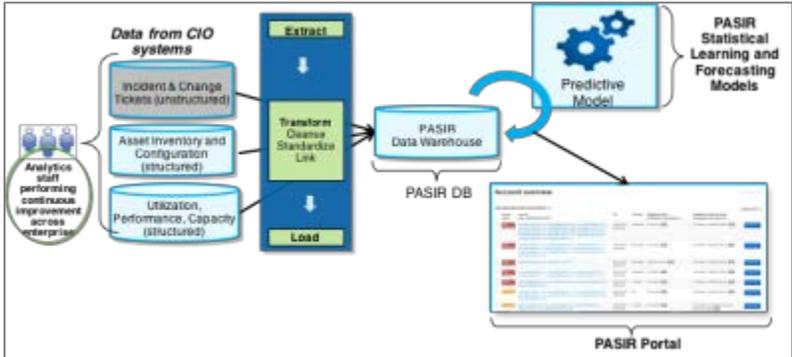
Please use the table to respond to the Commonwealth's questions.

Ref#	Category	Question	Supplier Response
A. Server/Storage Services			
Q1.	Server/Storage	The Commonwealth has upwards of 10 non-centralized Data Centers in Agency-operated buildings, primarily in the metro Richmond area. What are examples of Suppliers' best practices in managing the Servers, Storage, Firewalls, and Data Center LANs in non-centralized (Agency) facilities?	<p>IBM manages multiple non-centralized/distributed data centers including Servers, Storage, Firewalls for clients using best the following practices:</p> <ul style="list-style-type: none"> • Dedicated and shared delivery models by having a joint VITA/IBM Enterprise Architecture Group and Design Authority where standards are determined and deviations are discussed • Standards in technology will simplify solutions and lead to efficiency. Standards must be communicated to all agencies • Common set of tools in System and Service Management, i.e., monitoring, distribution, security, automation, backup, provisioning, etc. • Advanced predictive analytics in IT operations to prevent problems and outages before they happen and detect anomalies early • Automation and orchestration technologies to respond to changing business needs faster, more efficiently, and to enforce standards across the IT landscape • Follow Information Technology Infrastructure Library (ITIL) practices and implement a centralized Service Management tool with federated configuration management database (CMDB) • Single Pane of Glass for all of IT operations accessible from any device based on role (CIO to supplier, to retained IT ops) • Leveraging agile service delivery methodologies for enhanced service delivery optimization, efficiency and quality • Consolidating data centers and shifting certain workloads to a hybrid cloud environment • Unified toolset for both Network and Servers and Storage (Dynamic Automation) as described below.

Ref#	Category	Question	Supplier Response
			<p data-bbox="1094 196 1360 224">Dynamic Automation</p> <p data-bbox="1094 237 1927 370">We have optimized the delivery of various server functions and subcomponents to maximize cost-effectiveness and scalability for our clients and would apply this to the VITA solution, while maintaining key knowledge and local support.</p> <p data-bbox="1094 386 1940 732">Dynamic Automation is designed to leverage automation as the primary method of service delivery. It automates tasks relative to incident response and service request fulfillment. This framework provides IBM with the ability to extend rapid, consistent, and quality services to VITA. It also provides IBM with the flexibility VITA expects as a result of service demand fluctuation. Dynamic Automation applies to servers, storage, database, middleware, and groupware tasks. It reduces incident volumes and the overall mean time to resolve (MTTR) due to overall improvement in cycle time resulting from process optimization.</p> <p data-bbox="1094 748 1724 776">Dynamic Automation attains its efficiencies through:</p> <ul data-bbox="1094 792 1940 1450" style="list-style-type: none"> <li data-bbox="1094 792 1898 857">• The use of analytics to remove the causes of issues before they occur. <li data-bbox="1094 873 1793 938">• The pre-emptive execution of time sensitive or regular automations to avoid issues before they occur. <li data-bbox="1094 954 1913 1052">• The use of analytics to reduce the volume of false tickets, where no action needs to be taken, by modifying the monitoring parameters. <li data-bbox="1094 1068 1934 1198">• Reducing the manual labor by automating the creation of Incident tickets for monitoring alerts. These tickets are created on the correct ticketing system and assigned to the correct support teams. <li data-bbox="1094 1214 1940 1344">• Setting the severity and priority of actionable events automatically based on the business impact (e.g., Severity 1 incident on a server running critical business applications will take priority over a similar Severity 1 incident on a test or development server). <li data-bbox="1094 1360 1793 1450">• Automated interception of alerts: Invoking automated remediation as the first line of defense without human intervention.

Ref#	Category	Question	Supplier Response
			<ul style="list-style-type: none"> Autonomous response to incidents and service requests: Automated resolution of incidents and fulfillment of service requests. Automated assistance to incidents and service requests: Semi-automated resolution of incidents and fulfillment of requests where by automation is used perform the prerequisite steps needed to allow the human engineer to proceed quickly with the resolution (e.g. log file collection, basic troubleshooting). Problem and quality analytics for continuous service improvements: Identification of the next best area to automate as development opportunities, and problem patterns for root cause analysis. <div data-bbox="1094 634 1892 1154" style="text-align: center;"> </div> <p data-bbox="1346 1166 1688 1195" style="text-align: center;">Figure 1: Dynamic Automation</p> <p data-bbox="1094 1208 1927 1451">Today's typical environment consists of labor intensive operations requiring call outs and dispatching of personnel to resolve incidents, implement changes, and provide problem management. IBM's Dynamic Automation will eliminate the vast majority of non-actionable events and automate the response to the majority of what remains. It will improve service scalability, reduce operations complexity, and improve environment stability.</p>

Ref#	Category	Question	Supplier Response
			Dynamic Automation includes a built-in analytics engine to help it grow after its deployment. The system will identify opportunities as automation candidates, resulting in a continuous service improvement model. The broader framework will leverage the automation library and knowledge from across the IBM portfolio and apply them here as well. This is in addition to the feedback from the systems analysts, who are executing the few un-automated activities, to design new automation and optimize processes.
Q2.	Server/Storage	What does the Supplier recommend for the length of the contract for Server, Storage, and Data Center Services? Please describe benefits and trade-offs.	<p>Contract Length Recommendation</p> <p>Industry standard for contracts of this nature is normally five years depending whether there are any new investments, the length of transition, amount of transformation and the client's tolerance for change. IBM recommends that the term for a contract of this size would be five years with incremental annual renewal options of a year for no longer than an additional five years.</p> <p>Benefits and Trade-offs</p> <p>The benefits of a longer duration provides a longer period of time to stabilize the environment; minimize disruption to end users and strain on client resources and provide ample time to adapt to changes. Shorter contract duration provides flexibility to test the market for newer technologies and more competitive pricing and terms which can also be achieve through consumption based pricing model and flexible terms and conditions such as benchmarking.</p>
Q3.	Data Center	What do you recommend for the length of the contract for the Data Center Facility for this type of environment?	IBM recommends a five year contract with incremental annual renewal options of a year for no longer than an additional five years.
Q4.	Server/Storage	What does the Supplier recommend for technology refresh rate for the different types of Devices in VITA's environment? Is there an impact on the length of the services contract?	<p>Technology Refresh Rate</p> <p>There is no fixed term for technology refresh. Market trends recommend the following refresh rates:</p> <ul style="list-style-type: none"> • Three years for intel based technology • Four years for Unix • Five years for storage • Six to seven years for network equipment <p>Factors to be considered include age of technology, evolution of</p>

Ref#	Category	Question	Supplier Response
			<p>technology and application affinity with technology.</p> <p>We are shifting the paradigm to an advanced multivariate statistical analysis to help determine equipment refresh with an IBM delivery innovation called PASIR (described below). PASIR could be used to decommission/replace “problematic” equipment that is not eligible for refresh.</p> <p>IBMs’ Predictive Analytics for Server Incident Reduction (PASIR)</p> <p>PASIR is designed to pre-emptively analyze potential issues that may continuously or repetitively arise for servers. PASIR drives service improvement by evaluating performance data, configuration settings, and historical outage information of each server within an enterprise, identifying “problematic” servers – that is, servers which have statistically higher than normal outage minutes when compared to the total population.</p>  <p>Figure 2: PASIR proactively identifies problematic servers and “best” modernization action to reduce incoming incidents</p> <p>PASIR optimizes quality and cost of infrastructure hardware by identifying high risk/high workload server assets and potential ideas for remediation. The refresh strategy can be better aligned to problem systems first causing problem systems to be addressed before an impact event occurs. This reduces potential downtime and increases availability and performance SLAs. In addition, PASIR reduces ongoing support costs since systems that are problematic can be identified and corrective action can be taken.</p>

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			<p>PASIR runs periodically (usually every 6 months) in order to allow for sufficient historical data to be generated. It has a dashboard that is used by IBM support and the client to understand potential server "hot spots" and trends.</p> <p>PASIR portal suggests hardware refresh as the best improvement actions for the given problematic servers</p>  <p>Additional examples of modernization actions recommended by PASIR</p>  <p>Figure 3: PASIR Recommendations</p> <p>PASIR can proactively analyze asset, performance, and ticket data to predict problem servers before an outage occurs. PASIR's efficiency reduces the overall analysis time that would be difficult and time consuming to accomplish manually. It quickly identifies areas of concern that may not be discovered through manual analysis methods. All of these areas of focus help clients obtain a fact-based ROI to make decisions on spend associated with refresh of hardware and software.</p> <p>Impact on the length of the contract This will not have an impact on the length of the contract.</p>
Q5.	Server/Storage	The Commonwealth is interested in a separate hardware charge in the Server RUs to account for the initial capital outlay for physical servers. Is there a better way to represent the cost differences and hardware refresh cycle in the Server RU structure?	<p>IBM recommends the Hardware Service Charge (HSC) methodology for both the initial hardware charge and ongoing charges. In the HSC methodology, IBM provides VITA a projection of hardware charges for the term of the agreement based on the initial requirements. After the start of contract, VITA and IBM would meet quarterly and interlock on</p>

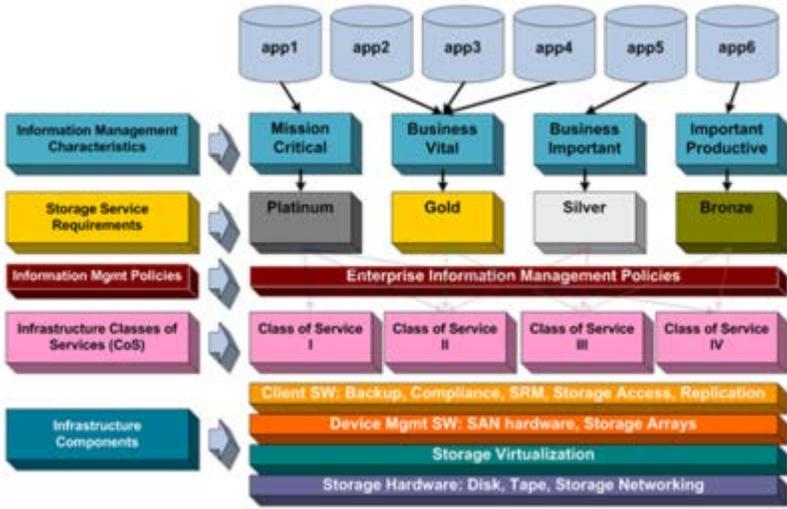
Ref#	Category	Question	Supplier Response
			<p>actual hardware requirements to be purchased during that quarter. VITA would be charged a monthly fee based on a predefined formula which takes into account the purchase price of the hardware, the cost of money, personal property taxes (if any), monthly hardware maintenance, cost of Operating Systems Software, and IBM procurement charge. The actual HSC charges would be reconciled against the mutually agreed to budget. The HSC methodology provides VITA visibility into the charges for hardware while providing a flexible environment for changes.</p>
Q6.	Server/Storage	<p>The Commonwealth is proposing tiering of services for Server and Storage in an attempt to align costs with availability and performance. Based on your experience, do these tiers of service have any challenges in developing a solution? Do you have experience with these service tiering model? Do you have any recommendations or enhancements for the Commonwealth to consider?</p>	<p>IBM has extensive experience with tiering of services for Servers and Storage. Tiering can be cost effective for VITA. Some of the steps in taking on tiering include:</p> <ul style="list-style-type: none"> • Inventory of resources • Identify and determine tier levels, performance, security, cost and other SLAs • Tooling • Criteria in determining what tier a system or application belongs • Migration plan <p>With our experience and best practices, IBM will work with VITA in defining the approach and execution in taking a tiered server and storage project.</p>
Q7.	Server/Storage	<p>The Commonwealth currently spreads costs across a very simple RU model. Do you have an enhanced RU model that could offer a larger variety of services while minimizing the RUs and their complexity?</p>	<p>Based on VITA's individual solution requirements and materiality of the individual requirements, IBM recommends individual resource units for the following:</p> <ul style="list-style-type: none"> • Physical Database Support • Logical Database Support • High Availability Support • Middleware Support • Active Directory • Storage Back-up • Off-Site Tape Storage <p>IBM will work with VITA to determine the correct balance between complexity and level of granularity to provide the maximum amount</p>

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			of flexibility and transparency.
Q8.	Server/Storage	The Commonwealth is including Bronze thru Platinum service levels for Server as examples of service categories. What would be required to implement this model in the Commonwealth?	<p>This is a common service level methodology for IBM clients and our service delivery practices. Factors to be considered when implementing the bronze through platinum model are:</p> <ul style="list-style-type: none"> • Application classification – production or non-production • Application criticality – critical or non-critical • Business Priority/Server Configuration – standard or high availability • Service tiering based on services to be performed
Q9.	Server/Storage	Do you see a better way to bundle or spilt the services we are requesting, in order to more effectively integrate with other towers (including MSI), and obtain more flexibility in the Commonwealth’s IT environment while maintaining appropriate Governance and security?	<p>We believe that there are some natural demarcations where industry has demonstrated the ability to integrate services and technologies such as disaster recovery and network services.</p> <p>Conversely, there are other services and technologies (such as server and storage) where a multi-supplier model may add significant service and technical complexity that require advanced integration solutions. Applying industry standards along with our service delivery experiences, we recommend VITA split data center facility services (i.e. perimeter security, air conditioning, UPS, and other facilities) as a separate tower.</p> <p>The industry trend towards IT as a Service (ITaaS) includes the ability to use multiple providers for services as needed, without a “lock-in” on any vendor. Other factors to consider which evaluating the flexibility, complexity and costs of bundling, splitting and integration of services:</p> <ul style="list-style-type: none"> • The IT industry has yet to develop standardized definitions of scope, processes, tools, interfaces, and reporting for the subcomponents within a service tower, necessitating additional design, development, implementation, and testing of these services and the technical integration factors, to enable end-to-end service delivery. As the number of providers and sub-towers increase, the number of these integration interfaces multiply, as does the cost and risk. • Over time as each provider continues to evolve their services and technologies, continuous updating of the integration points will be

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			<p>required throughout the life of the contract. Some providers will have to factor into their pricing the cost and risk of maintaining these interfaces potentially undermining VITA’s objective of providing more attractive pricing to their customers. A provider with a flexible integration solution that allows for multiple provider’s services that can be easily updated would provide more value to the Commonwealth.</p> <ul style="list-style-type: none"> • The introduction of innovation may also be impacted since providers often develop innovations that span across multiple subcomponents of towers. Many of these innovations are proprietary tools or applications which may be restricted to the use of the provider’s services personnel and/or infrastructure, making it difficult for VITA to take advantage of these innovations. If a provider has an enterprise-wide integration platform, the full benefits of ITaaS can be increased over time. • A multi-provider environment within a Tower introduces differences in scope, processes, tools, interfaces, and reporting that makes it very difficult to provide a seamless end-to-end service. As an example, many customer functions are reliant on an integrated ecosystem of applications and data that if spread across multiple provider’s servers and storage services and technologies, can introduce operational and technical complexity, making problem identification and root cause analysis difficult and resulting in delayed problem resolution. A provider that has a strong enterprise ITaaS solution would be able to counter these complexities while providing the most efficient combination of provider’s services. <p>IBM recommends that each service tower is awarded to a Service Provider that has a strong ITaaS platform and strategy to allow for multiple provider solutions to be utilized by the Commonwealth.</p>
Q10.	Server/Storage	Are their new Storage offerings, like Object Based Storage or predictive storage, that the Commonwealth should include in storage or enhanced services? How do you offer and charge for virtual storage?	<p>New storage offerings may be suitable for the Commonwealth depending on the business requirements. IBM recommends the Commonwealth perform an Information Lifecycle Management (ILM) study and assessment on its current and future storage needs to determine if any new storage offerings would be beneficial.</p>

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			<p>IBM has several software defined storage (SDS) offerings using several OEM products for NAS (file) storage. These are using commodity hardware with intelligent storage management software.</p> <p>Additionally, IBM has been providing Storage as a Service, where we are taking full ownership and control of the storage environment and billing the customer using a service rate, typically based upon used storage. This is for greenfield storage environments, meaning we would only move a customer to a Storage as a Service (Saas) solution at hardware refresh time, where we could eliminate enough of the physical hardware to make this cost effective.</p> <p>Charging mechanism</p> <p>In a standard solution approach IBM would typically bill based on the amount of physical allocated or physical usable. If it is a Storage as a Service solution then we would bill based on used storage. So we never actually charge for the virtual storage that has no real hardware and is strictly virtual.</p> <p>IBM recommends the Commonwealth perform an Information Lifecycle Management (ILM) study and assessment on its current and future storage needs to determine what storage offerings would be beneficial.</p> <p>IBM’s Information Lifecycle Management Services</p> <p>A key component in leveraging new storage technologies is to first appropriately understand the data and information lifecycle requirements. IBM’s Information Lifecycle Management (IILM) defines processes, policies, technologies, and tools for managing information through its lifecycle, from conception until disposal, using the most cost effective resources. IBM proposes implementing an Intelligent Storage Service, an incremental, holistic approach to data management that focuses on cost take-out while solving longer-term systemic storage challenges.</p> <p>Through IBM’s Intelligent ILM services, we will enhance VITA’s use of tiered storage or separate storage levels to host different types of data, the classification and management information, the establishment of information management policies, and last (but very</p>

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			<p>important) the development of a robust storage governance model to help sustain results. It is important to manage information more productively. IBM will deliver the IILM solution to VITA to gain insight and to allow VITA and IBM make better decisions and help ensure that the proper alignment exists between the variable cost hardware tiers, information classes, and right VITA defined storage classes of service.</p> <p>IILM optimization approach will accelerate VITA's storage strategy by using data analytics, archiving, virtualization, tiering, and data classification strategies to facilitate effective storage optimization. The deployment of this strategy will vastly reduce TCO and reduce the need for downtime for migrations between storage arrays.</p> <p>Additionally, IILM provides demand-side management with a flexible storage process governance framework. IILM will complete the following activities:</p> <ul style="list-style-type: none"> • Provide enhanced storage reporting and the chargeback reporting capability • Automate data lifecycle management, which will remove the need for manual cleanup and migration • Facilitate a proactive management framework where application tier placement is dictated by its value over time • Archive of structured data where opportunities exist <p>Intelligent Storage Service</p> <p>The Intelligent Storage Service creates a VITA business-relevant storage service catalog that is an integrated part of how storage services are requested, via the Intelligent Storage Services Request, and delivered. This is a policy driven approach that categorizes storage requirements by Data Types, with a user-friendly request procedure that speeds time to deployment, fully captures storage requirements (such as speed, capacity, RTOs and RPOs, ILM policies, and regulatory requirements) and simplifies capacity management and insight.</p>

Ref#	Category	Question	Supplier Response
			 <p style="text-align: center;">Figure 4: Intelligent Storage Service</p>
Q11.	Server/Storage	The Commonwealth is interested in ensuring it provides optimal storage performance and availability for VITA and VITA’s Customers. How do you propose to provide and measure this performance?	<p>Optimizing storage performance and availability is achieved through several approaches, including:</p> <ul style="list-style-type: none"> • Deployment of different storage technologies, such as flash, disk and tape • Implementation of a tiered model, based on factors such as input/output (I/O) requirements (e.g. input/output operations per second (IOPS), throughput, total storage size, read vs. write, etc.) • Development of suitable chargeback models based on the tiers • Continuous monitoring of the services across all relevant performance measures • Intelligent and automated adjustment between tiers • Implementation of Intelligent ILM
Q12.	Server/Storage	The Commonwealth has traditional x86 virtual servers, but it is also interested in the capabilities of a private cloud. Could they be combined or left separate? Please describe how this could be accomplished most effectively.	<p>The best and most strategic approach is to combine the traditional server environment with the cloud environment to create a hybrid cloud computing environment that can maximize the value and balance the use of legacy assets and cloud services while enabling better scalability. A hybrid cloud computing can:</p> <ul style="list-style-type: none"> • Maximize cost efficiency through competition and automated

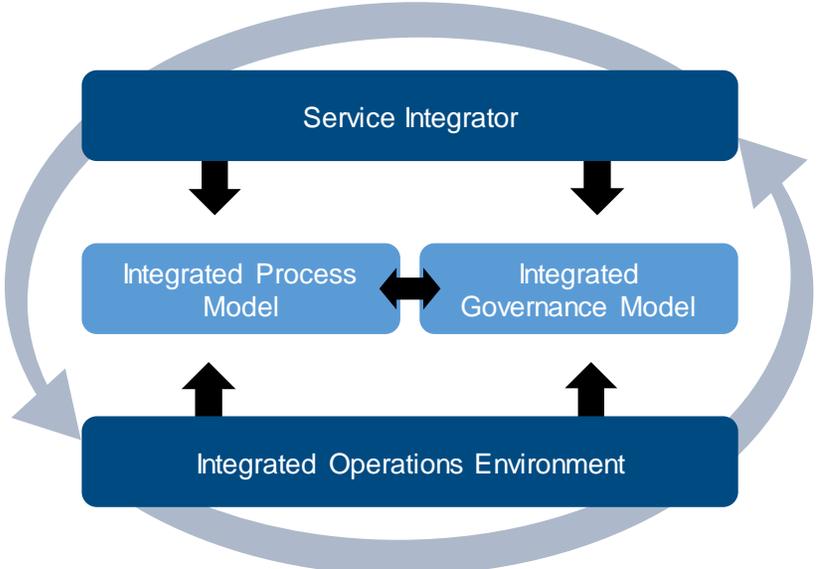
Ref#	Category	Question	Supplier Response
			<p>arbitrage.</p> <ul style="list-style-type: none"> • Allows an enterprise to balance isolation, cost and scaling requirements. • Makes it easier to leverage new functionality quickly, with better agility. <p>How this could be accomplished most effectively</p> <p>The key to a successful hybrid cloud environment is understanding the workloads and their readiness for cloud.</p> <p>Cloud Workload Assessment</p> <p>We use our tools and methodology to provide a granular, quantitative analysis of both business applications and infrastructure components to help determine the right target environment for private cloud and traditional environments as well as public cloud, where applicable.</p> <p>The workloads are examined and filtered based on the agreed-upon criteria and the workloads' affinity to the target environment. We can also identify potential migration impacts of each workload, enabling you to better prepare for the process.</p> <p>Using our established methodology and robust analytical tools, we can provide you with the detailed information you need to make educated decisions about the best workloads to move to a target cloud environment(s). We use analytics, experience, and structured workshops to review and analyze your data based on your current environment, nonfunctional requirements, and your Cloud strategy. Our solution feeds the data through our analytical tool to help develop a focused list of workloads. We then further refine the list, using our knowledge based on many implementations and your nonfunctional requirements. This can reduce your analysis time by up to 66% more than if you analyzed the data manually.</p> <p>IBM Cloud Orchestrator</p> <p>IBM Cloud Orchestrator solution allows our customers to provision infrastructure in a private cloud or leverage public clouds based on a set of policies defined by the customer. The end user does not have to know where the infrastructure is provisioned.</p>

Ref#	Category	Question	Supplier Response
			IBM also has a cloud broker solution that will show the cost of private cloud, different Public Cloud providers, e.g. IBM SoftLayer, AWS, Azure, etc., so the customer can make a decision with cost in mind.
Q13.	Server/Storage	How does Database as a Service make sense for an Enterprise like the Commonwealth? Do you have any recommendations for how to charge for enhanced Database services (i.e., Development DBA)?	<p>There are many advantages of Database as a Service (DBaaS) that an enterprise like the Commonwealth can take full advantage of. In addition to the benefits of a consumption based model, some of the other advantages are:</p> <ul style="list-style-type: none"> • Quickly provision a database instance. Instead of having to going through a detailed design and architect cycle and specify everything needed and relying on a DBA to create a database, a developer, as an example, can go through self-service and quickly create a database to start his development project • Management and support of the underlying infrastructure such as the operating system, database management software, patching, release upgrade and performance tuning. • Inherent elasticity in a consumption based model to handle growth and contraction in demand. • Leverage cloud DBaaS for short term database needs or when the Data Center temporary runs out of resources, a cloud DBaaS can be quickly leveraged without slowing down a project • An organization will realize cost savings with standards of a DBaaS • Allow for different tiers of DB, e.g. enterprise DB, departmental DB, Cloud DB, etc. <p>The charging methodology of a DBaaS is fundamentally based on the specific patterns the Commonwealth requires for its database services. IBM will work with the Commonwealth to define the necessary patterns to determine how to charge a user for DBaaS since every environment, infrastructure, people resources, SLAs, etc. is different from one organization to another.</p>
Q14.	Server/Storage	The Commonwealth wants to provide cost effective solutions to VITA and the Agencies. What do you describe as the key cost and value drivers that would help the Commonwealth offer services that are not cost prohibitive to deliver? Do you see any requirements in	The fundamental building blocks of a successful IT service delivery are people, process and technology. The best way to optimize the benefits of these parameters while provide the most cost effective solution is to design IT services that maximizes the use of standardization and automation.

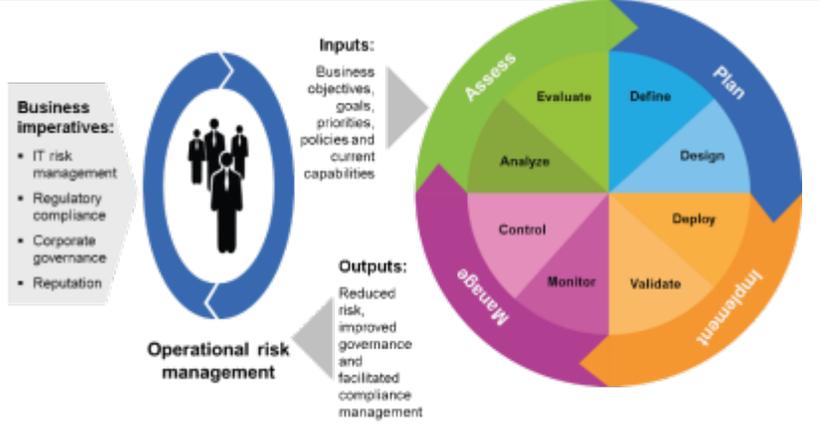
Ref#	Category	Question	Supplier Response
		<p>the description of services in this RFI that would cost more to meet than the business value they provide?</p>	<p>The IT as a Service (ITaaS) epitomizes these principles to create a framework that delivers speed and agility while lowering costs, allowing VITA to offer new capabilities often before they are even requested. The CIO serves as a broker of services to the agencies that can now consume these standardized services, both cloud and non-cloud, in a financially transparent manner and only paying for what is used.</p> <p>Enterprise IT as a service offers a competitive edge now and will likely be a fundamental requirement for enterprises in the future. It brings a host of benefits while facilitating your organization’s transformation:</p> <ul style="list-style-type: none"> • Leverage new technologies • Fuel competitive advantage by harnessing data and analytics • Establish a holistic approach to IT for the enterprise • Maximize the return on existing investments • Gain visibility and control • Meet spikes in demand instantly and automatically • Pay only for what you use <p>IBM and VITA can implement an Enterprise IT as a Service model which allows the flexibility and agility to provision and deploy IT services and technologies such as Compute, Storage, and Network, all as a Service. What this really means ultimately is that the agencies and VITA will be able to provision workload when needed and only pay for what is used, not just across the infrastructure, but also across IT services that would traditional be delivered with dedicated staff.</p> <p>A Hybrid IT model can allow VITA and the agencies to benefit from “persistence” or only paying for systems that are on and running. With Cloud patterns implemented and application workload affinities defined, entire environments and applications can be powered down when not in use, leading to significant cost savings.</p> <p>IBM looks forward to working with VITA in the future on a potential ITaaS solution. IBM is investing heavily in this area and we believe that Hybrid IT driven by ITaaS can bring significant benefits to VITA and the agencies it manages.</p>

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			<p>We have not observed any requirements in the description of services in this RFI that are uncommon in a standard enterprise such as the Commonwealth. However, to be able to quantify the value of the IT services vis-à-vis the business value, we would recommend a cost benefit analysis as such determination is very subjective and varies from enterprise to enterprise.</p>
Q15.	Security	<p>The Commonwealth is interested in an Enterprise Key Management System for compliance and security. How do you propose the Commonwealth request Key Management services?</p>	<p>When evaluating Enterprise Key Management Systems, IBM recommends VITA request solutions that give you the flexibility to:</p> <ul style="list-style-type: none"> • Manage keys within separate, but organized, silos. The right encryption key management solution can simplify complex key distribution and management, reducing administrative burdens within each silo. • Have centralized control and policy-driven key management. Your encryption key management solution should allow consolidated management of keys across domains, support standards that extend management across products from multiple vendors, and integrate well into existing security-team methodologies. • Count on high availability and support for disaster recovery. The leading encryption key management solutions work with a wide variety of clustering, replication and failover implementations, leveraging your current investments. To reduce the chance of data loss, look for a solution that has built-in, automatic cloning capabilities. • Facilitate compliance management. Enterprises need to remain compliant with the changing regulatory world. Centralizing key management supports audits against information security practices. In addition, it also allows enterprises to properly dispose of data in accordance with their data retention policies and aligns with federal guidance on cryptographic erasure through the proper destruction of encryption keys (NIST Special Publication 800-88).
Q16.	MSI	<p>Identity and Access Management (IAM) services and the systems supporting those functions are currently split between multiple providers. How do you propose bringing these services together to provide a single</p>	<p>Having many IAM services can be problematic and frustrating for end users due to the inherent complexity in designing a workflow for a service request in such an environment. This will also elongate the cycle time due to multiple hand-offs involved. This not only creates</p>

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		integrated service?	<p>additional security exposure but also increases the cost of services. IBM would recommend consolidating the IAM services to a single vendor to ease the integration of services and simplify the service request process.</p> <p>To get to the end goal of having IAM services within the Commonwealth, the following steps are recommended:</p> <ul style="list-style-type: none"> • Create IAM inventory • Determine from existing IAM systems on which one to standardize on. If not, identify IAM of choice • Determine whether a single enterprise LDAP is appropriate • Synchronize all the existing LDAPs (bi-directional or one way to enterprise LDAP) • Develop a migration plan <p>IBM will work with VITA to assess the current environment and create a strategy and implementation plan to achieve the ultimate outcome</p>
Q17.	MSI	The Commonwealth has defined the cross-functional requirements in Exhibit 2.2. Do you have any comments in the structure and handoffs identified in this document? Do you have any prior experience working with MSIs? Do you have any recommendations regarding the approach for how the MSI should interact with the other suppliers?	<p>IBM has extensive experience in working with multi-supplier managed services relationships worldwide. We have historically worked with cross-functional requirements and are comfortable working with MSIs. We understand the importance of providing seamless integration of all service and support providers to deliver effective end-to-end services. On any individual customer engagement, it is common to work with other suppliers that provide other service towers or elements of the service.</p> <p>A very open, transparent and communicative approach will ensure success. This includes clearly defined lines of roles and responsibilities.</p> <p>Approach and Methods Employed</p> <p>When we work with other service providers, we will work with them as part of the overall team. We will share information as appropriate, as we would with VITA personnel directly, that they need to provide an efficient, high-quality service. Our governance structure is organized to function in a multi-vendor environment. This includes optimization of subcontractors and tracking delivery resources to ensure accuracy of invoices.</p>

Ref#	Category	Question	Supplier Response
			<p>IBM’s experience with multi-supplier environments includes those where another service provider provides service management support or acts as a service integrator. In cases such as this, our standard, proven delivery model and governance organization featuring our cross supplier procedures allow us to integrate with the service integrator and other service providers working within the client’s environment.</p>  <p>Figure 5: Example of Service Integration Model</p> <p>In cases such as this, IBM typically uses an integrated process model developed and managed by the service integrator or client, which should allow suppliers to retain their own internal operational processes and also interlink with each other through a defined set of standards and interfaces. This mechanism supports rapid integration as there is no need for suppliers (including IBM) to make changes to their internal processes or tooling; their effort is limited to and focused on ensuring their tools and processes can interface in a standard manner.</p>

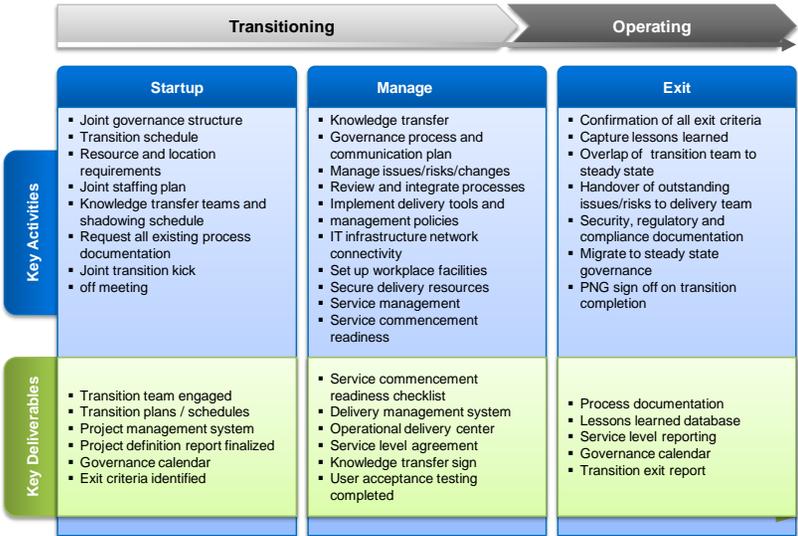
Ref#	Category	Question	Supplier Response
Q18.	MSI	Do you see any benefits or challenges in requiring the Data Center facility provider to also be responsible for providing common operating monitoring groups in the same solution (e.g., CMOC, ITOC, SOC, NOC)?	<p>Data Center facility monitoring is vastly different from common operations monitoring such as CMOC, ITOC, SOC and NOC. Not only does data center facility monitoring require completely different skills and experience, but also the incident management and business impact are quantifiably different.</p> <p>Challenges</p> <p>The challenges of having to combine these two very different disciplines are:</p> <ul style="list-style-type: none"> • Service provider • Skill and experience • Major incident management • Lack of synergy • Lack of any significant cost benefit <p>Benefits</p> <p>Though there is little benefit in combining these operational services such as a single service provider. However, it is not uncommon for the operational monitoring service provider to also monitor the facility consoles or audible alarms and then report such incidents.</p>
Q19.	MSI	The Commonwealth currently has a single traditional DR solution that requires the entire backup Data Center to be failed over. There is a desire to move to a more flexible solution that allows single Agencies or even applications to be failed over individually. This process requires design, development, operations, testing, and coordination. What role should VITA's MSI should play in this effort in relation with the Server Services provider?	<p>A centralized governance program is critical for managing and maintaining a sustainable business resilience program. IBM believes that in order for VITA to achieve the goal of a flexible resiliency and DR solution, a detailed Business Impact Analysis (BIA) needs to be done which would be led and governed by the MSI.</p> <p>IBM's resiliency approach uses a lifecycle methodology to help VITA achieve sustainable improvements in business resilience. The IBM BIA would focus on the Assess phase of the overall approach as depicted below. The Plan phase would be led by the MSI and performed by the joint VITA/MSI Enterprise Architecture team. The Implement phase would be done by the service providers responsible for the respective service support areas. The Manage phase of the approach would be done by the MSI.</p>

Ref#	Category	Question	Supplier Response
			 <p data-bbox="1102 625 1123 641">21</p> <p data-bbox="1312 646 1711 673">Figure 6: IBM's Resiliency Approach</p> <p data-bbox="1092 690 1942 998">As the first phase of framework, IBM's Business Impact Analysis (BIA) identifies and prioritizes the critical business processes and key resource dependencies that most affect revenue, customers and business survival. Calculating the cost of downtime to business for critical business processes, applications, and data, the IBM BIA helps to prioritize availability of information and processes and to rationalize investments in business continuity, recovery, and availability. IBM does this by leveraging our tested and proven IBM Resilience Framework.</p> <p data-bbox="1092 1015 1680 1047">Below are some of the highlights of the IBM BIA:</p> <ul data-bbox="1092 1055 1911 1461" style="list-style-type: none"> • Helps define resilience requirements by determining critical business processes and resources based on impact during a disruption • Provides a solid business case for investments in business continuity and resilience • Delivers recommendations to help you select and implement an effective risk mitigation strategy • Provides recovery time objectives (RTOs), recovery point objectives (RPOs) and availability requirements for strategic resilience planning by • Optimizes costs by categorizing processes and applications and

Ref#	Category	Question	Supplier Response
			<p>agencies into Resilience Service Tiers.</p> <p>IBM's BIA Provides recovery time objectives (RTOs), recovery point objectives (RPOs) and availability requirements for strategic resilience planning by Resilience Service Tier. This effectively allows critical applications, business units, or in VITA's case agencies, to have a flexible DR strategy by tier. Each Resilience Service Tier would align to a single critical application or could be defined by agency. This will allow individual applications or agencies to failover without requiring the entire data center to failover. The implementation of this new DR strategy would be managed by the MSI though the global VITA / IBM joint governance process.</p> <p>Once the DR tiers are defined and the BIA completed, then advanced solutions from IBM such as IBM DR as a Service (DRaaS) in the cloud can be leveraged, allowing VITA to pay for DR services, only when needed, and by DR tier.</p>
Q20.	Data Center	The Commonwealth is interested in Multi-site High Availability and Disaster Recovery Services. At a high-level, what do you recommend on the number and locations of centralized Data Centers the Commonwealth should utilize for that purpose? Any tradeoffs?	<p>The number and locations of data centers for a High Availability and Disaster Recovery service is driven by the criticality of application availability such as Active/Active and Active/Passive and the consequential business impact. IBM recommends a minimum of two locations for High Availability within the distance in line with disk write latency while a third center for Disaster Recovery. The application architecture and data replication are also major factors in deciding the network architecture and connectivity among the data centers.</p> <p>Disaster Recovery Assessment</p> <p>IBM also recommends VITA consider a disaster recovery assessment where we evaluate your IT disaster recovery plans and strategies to help determine your ability to meet your disaster recovery/business continuity requirements. The assessment covers the following:</p> <ul style="list-style-type: none"> • Identify vulnerabilities in your current recovery solution • Help measure your ability to meet recovery objectives for crucial processes • Provide insights on how to improve your abilities to meet availability, recovery time and recovery point objectives • Provide recommendations on what is needed to recover from any

Ref#	Category	Question	Supplier Response
			<p>kind of business disruption</p> <ul style="list-style-type: none"> • Help optimize spending on your resilience program and assess various alternatives and determine specific “tradeoffs” that may exist <p>IBM’s Disaster Recovery Leadership</p> <p>According to the IDC MarketScape, cloud-based disaster recovery services have emerged rapidly as both small and large businesses look for a cost-effective way to ensure that data is protected and business activities can continue in the event of a system-wide disruption. The IDC MarketScape cites IBM as being well known and respected in the industry, offering disaster recovery services long before Disaster Recovery as a Service (DRaaS) was even a concept.</p> <p>IBM was named as a leader in the report. IBM Resiliency Services' strong consulting services, size, scale and long history of DR services, ability to manage entire DR process for the customer, and complete solution across all platforms are just some of the strengths noted by the IDC MarketScape.</p>

Ref#	Category	Question	Supplier Response
			<p data-bbox="1213 220 1780 261">IDC MarketScape: North America Disaster Recovery-as-a-Service Vendor Assessment</p>  <p data-bbox="1230 829 1415 854">Source: IDC 2015</p> <p data-bbox="1115 886 1839 935">SOURCE: IDC MarketScape: North America Disaster Recovery-as-a-Service Provider 2015 Vendor Assessment, by Phil Hughes and Phil Goodwin, November, 2015, IDC #259816</p> <p data-bbox="1192 959 1843 984">Figure 7: IDC Recognizes IBM's Leadership in DRaaS (2015)</p>
Q21.	Migration	Suppliers will be required to provide an implementation plan to specify how they will take over responsibility for the existing environment. The Commonwealth is also interested in recommendations with regard to how the Commonwealth could migrate or transform to new Service offerings. What do you recommend for this migration plan?	<p data-bbox="1094 1008 1938 1317">A detailed and thoughtful migration plan is key to the successful transition to a new service provider. IBM transition methodology ensures quality, mitigates risk, accelerates VITA's path to sustainable efficiency, and puts the foundation in place for continual improvement of services. This is achieved through a gradual, measured, phased approach and implementation of proven delivery technology and services. This transition is driven by a robust and proven governance structure that fosters a partnership and complete transparency for all levels within VITA.</p> <p data-bbox="1094 1333 1938 1433">An effective implementation plan carefully considers each and every workload and the interdependencies between workloads and core infrastructure services. From that analysis many transformation</p>

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			<p>opportunities will likely be revealed. Some may include:</p> <ul style="list-style-type: none"> • Upgrading of underlying software to enable new deployment or integration capabilities • Migration of physical server workloads to virtual images • Transition from on premise to cloud for hosting • Transition from traditional software to SaaS offerings <p>Our implementation/transition plan is built on a proven methodology with thousands of successful transitions over the 20+ years of IBM Managed Services. Our plan is to staff the transition team with architectural and operational subject matter experts to turn a jointly developed Roadmap journey into reality. The vision that VITA has established has the same characteristics of many of our current managed services clients. We are excited about the possibility to do the same for your operation.</p>  <p style="text-align: center;">Figure 8: IBM's Transition Approach</p> <p>Migration Plan Options</p> <p>There are two options for service:</p> <ul style="list-style-type: none"> • Day 1 support of the entire environment, then transition services

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			<p>and migrate workloads over a period of time.</p> <ul style="list-style-type: none"> • Complete transition and migration over a 9-12 month period before IBM service begins.
Q22.	Enhanced Services	The Commonwealth is interested in receiving proposals to include new enhanced services, (e.g., Cloud, Analytics, Managed File Transfer) Can you recommend any other such enhanced services the Commonwealth should also consider including at the moment? How would you recommend these services be delivered?	<p>Cognitive Computing service tower to include technologies and services that provide the opportunity to significantly improve IT services and to provide VITA’s clients with tools to improve the cost and effectiveness of public services. Analytics and Cognitive computing provides tools to better analyze structured and unstructured data so as to identify trends, root causes, and potential remedies to problems. The initial delivery of the services could be implemented through a Cognitive Computing prototype designed to address a specific IT challenge and provide VITA end users with a forum to test and refine or broader use.</p> <p>The capabilities of these technologies goes well beyond data analysis and data mining to create hypothesizes and associations not possible with traditional data mining techniques. As an example, these technologies are already being used to help physicians diagnose and treat cancer based on the analysis of thousands of case files consisting of structured (e.g. genetic tests) and unstructured data (e.g. medical images), and to use information from research organizations and drug companies to provide physicians with the best possible diagnostic tools and recommended course of treatment that are customized to each patient. VITA’s customers could benefit from these technologies by being able to better anticipate and understand how and why the needs of taxpayers are changing and proactively implement changes to services to improve taxpayer satisfaction while also improving the efficiency and cost of delivering these services.</p> <p>These tools can also be used by VITA to assess IT operations, through Watson Decision Advisor for the CIO. These cognitive computing tools assess IT operations for opportunities to improve the effectiveness and cost of IT services by analyzing applications, data, and infrastructure performance information along with cost, quality, and efficiency information to provide insights and recommendations for changes to improve IT operations.</p> <p>VITA’s strategy to engage multiple Service Providers to drive benefit</p>

Ref#	Category	Question	Supplier Response
			<p>for VITA can be effective when the relevant scope is a discrete offering, such as a cloud-computing provider. In this case, VITA could offer value to their customers by providing choices with respect to cloud services – for example, VITA’s agency clients could choose to host their applications within AWS, MS Azure, or SoftLayer based on their technical and business requirements.</p> <p>Many of VITA’s clients may, in architecting their cloud environment; need assistance to understand their business requirements in order to choose the cloud provider (and their offerings) that best satisfies their requirements. IBM suggests that VITA consider adding Cloud Brokerage services as a service component to the Server Service Tower within the overall RFP.</p> <p>The following benefits result from using a cloud-brokerage service:</p> <ul style="list-style-type: none"> • Reduce the costs of cloud services by using cloud brokers • Integrate multiple IT environments –existing and cloud environments, for example, establish hybridity – as well as integrate services from multiple cloud providers • Understand what cloud services are available via a catalog • Provide policy-based service catalog populated with only the cloud services that an enterprise wants their employees to purchase • Leverage unified purchase of cloud services • Assess current applications for cloud readiness • Ensure cloud services meet enterprise policies • Ensure data sovereignty laws are followed <p>We believe that this scope is best suited to reside within the Server tower and a single service provider should be engaged to provide that scope. Doing so will ensure that server and cloud capabilities reside within a single delivery organization. This will increase overall delivery efficiency and allow VITA clients a “single point of contact” for their server or cloud computing needs.</p>
Q23.	Enhanced Services	As the technology landscape changes in the Commonwealth’s environment, could you describe other enhanced services that VITA and VITA Customers	<p>Enhanced services to be considered in the future</p> <p>There are many services IBM can bring to VITA to help enhance VITA capabilities in IT. Based on the RFI IBM has determined there are some</p>

Ref#	Category	Question	Supplier Response
		<p>should consider in the future?</p>	<p>key ones that VITA may benefit most from listed below.</p> <p>Migration to an IT as a Service (ITaaS) Operating Model</p> <p>IBM’s vision is to deliver an “IT as a Service” (ITaaS) operating model that enables the VITA to become a growth enabler and strategic differentiator for the business. IBM’s ITaaS model, shown below, creates value for the business by improving speed and agility while lowering costs by enabling the ability to consume tiered, business-outcome focused IT services in a financially transparent manner. Operating under the new model, the role of VITA shifts from one of support to one that proactively brokers innovation that matters to the business, integrates internally- and externally-sourced solutions, and dynamically orchestrates IT service delivery for improved business outcomes. In this way, VITA becomes essential to the business.</p> <div data-bbox="1108 695 1917 1284" data-label="Diagram"> </div> <p>Figure 9: IBM “IT as a Service” Operating Model</p> <p>Value Creation Center</p> <p>The Value Creation Center is an approach that IBM selectively adopts with large enterprises to jointly use technology innovations in order to</p>

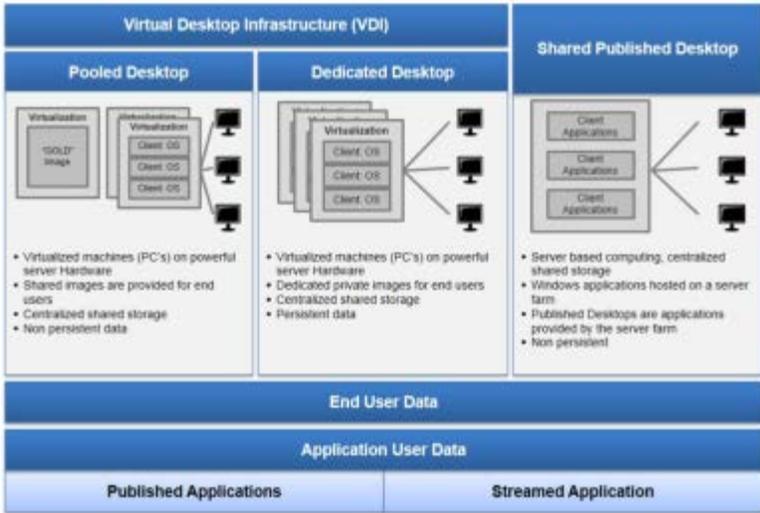
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			<p>generate new business value in the context of long-term strategic outsourcing relationships. Such a value creation program will create a fast channel to IBM internal innovation capabilities, such as IBM Research, development sites, and other Centers of Competence. The strategic combination of IBM technical expertise with VITA’s industry expertise will allow for truly significant and impactful innovative outcomes. The program will be highly coordinated with the IBM and VITA governance and structure and will benefit from senior management sponsorship from both partners.</p> <p>The Value Creation Center (VCC) can provide continuous support for IBM-VITA strategic initiatives and business goals. IBM will commit resources into the VCC to support identification, development, and management of a pipeline of innovation initiatives of strategic interest to VITA. The following components are central to the VCC concept:</p> <ul style="list-style-type: none"> • Understanding trends and directions for technology and business • Analyzing technology for new business initiatives • Evaluating options and initiating proof-of-concept projects driven by business goals • Supporting a disciplined process for VITA’s adoption of new technology <p>The power of the model for VITA is the significant investment that IBM makes in bringing the right resources to address VITA’s challenges in a continuous fashion. For IBM, the value is a deepened understanding of VITA’s business challenges, which can be used as feedback into the Continual Improvement Program.</p> <p><i>Design Thinking Innovation Lab</i></p> <p>At IBM, we define design as the intent behind an outcome. We use design thinking to form intent by developing understanding and empathy for our users. IBM Design Thinking is our approach to applying design thinking at the speed and scale the modern enterprise demands. It’s a framework for teaming and action. It helps our teams not only form intent, but deliver outcomes, outcomes that advance the state of the art and improve the lives of the people they serve.</p> <p>Design thinking is an agile and open way to gather new ideas and is</p>

Ref#	Category	Question	Supplier Response
			<p>user-centric. Design thinking can help generate new ideas aligned to the needs of the end-user personas and adapted to specific client pain points and issues.</p> <p>Watson Cognitive Value Assessment (CVA)</p> <p>IBM Watson CVA will develop VITA specific use cases for the application of Watson technologies in various capacities across the agencies and VITA. There is unique opportunity for us to identify, confirm, track, and monetize measureable business value for Watson solutions across VITA business processes and industries</p> <p>The Value Creation framework defines the plan and path for clients to achieve breakthrough results with Watson. Watson is a journey which starts with the CVA and gradually expands into business domains.</p> <p>Value realization is:</p> <ul style="list-style-type: none"> • The currency to mobilize clients toward action • The language our clients speak to help them understand how to apply technology • The guide book to show how new technologies can move the performance needle <p>Additionally, we can extend the CVA framework to develop the first prototype for the client’s use case. The purpose of developing a prototype is to allow VITA to see what the end state of their developed use case could look like using visual design treatments and focusing on the workflow for one Use Case scenario.</p> <p>IBM Development & Test Environment Services (Dev/Ops)</p> <p>IDTES is a public cloud dev/test IaaS service provided to clients for testing applications before promoting to production. This service could be a key component in VITA’s release management process.</p> <p>It provides a low cost, pay per use solution for application development and testing instead of requiring dedicated hardware and software as well as support 24x7 for a test environment only needed part of the time. The cost savings can be significant for clients and they are not locked into a platform, technology, or vendor.</p> <p>Business Analytics Service</p>

Ref#	Category	Question	Supplier Response
			<p>IBM Business Analytics Service (BAS) is able to create visualizations and analytics views of key IT services across the business. This can be presented to various users through customized views. The data can be viewed on a traditional web browser or on a mobile device or iPad.</p> <p>The value to VITA is faster, more informed decision making for C-level executives and other key personas that will reduce VITA costs by reducing the time it takes to evaluate IT services with business objectives.</p> <p>Watson Semantic Text Analytics</p> <p>Watson Semantic Text Analytics (WSTA) allows IBM to perform preventive, prescriptive, and predictive actions from fragmented and unstructured descriptions in VITA tickets. WSTA proactively identifies service improvement and cost takeout opportunities that often go undetected. There are four key capabilities built within this offering that bring additional advanced analytics capability to VITA:</p> <ul style="list-style-type: none"> • Incident ticket reduction, • Ticket resolution time improvement, • Defect prevention, • Agent training and knowledge base improvements. <p>Incident ticket reduction uses semantic text analytics and resolution free text on tickets to classify them into derived failure groups and associated resolver groups. This identifies pervasive issues for elimination such as password reset. In order to improve ticket resolution times, WSTA platform uses real time text analytics to dynamically route tickets to the most skilled person (performance – extraction from data patterns). This improves ticket resolution times by reprioritizing incident tickets and reduces resolution time using agent data for optimization. Defect prevention uses change-point detection and topic identification from change and incidents tickets to identify and stop pervasive and emerging issues from propagating.</p> <p>IBM Workplace Analytics</p> <p>The IBM Workplace analytics platform provides VITA with the business intelligence to address a broad set of operational and security</p>

Ref#	Category	Question	Supplier Response
			<p>requirements, empowering them to make better decisions, dramatically improve productivity and reduce costs. IBM Workplace Analytics performs complex IT tasks to workstations like automated power management, user auditing, performance monitoring, change management, event management, latency and end-user experience management, application resource analysis, chargeback, virtualization assessment and planning, application pool design and many others. IBM Workplace Analytics provides all of these features in both web report and interactive forms.</p> <p>IBM Workplace Analytics is delivered through software and infrastructure. It is dedicated instance on the VITA premises. IBM Workplace Analytics comes with a dashboard where VITA can view end user data across many different systems and remote locations simultaneously and find patterns.</p> <p>IBM Workplace Analytics will provide VITA control and advanced analytics and monitoring of their end user environments and desktop and laptops as well as VDI images. It provides policy based security and can track performance issues as well as track the assets and proactively find problems.</p> <p>CiRBA</p> <p>Policy-based orchestration technologies like IBM Cloud Orchestrator and VMware VRealize take advantage of CiRBA to provide software-defined infrastructure (SDI) that enables the creation and operation of open, elastic IT infrastructure that operates independent of any hardware specific dependencies.</p> <p>As SDI environments scale up and become more self-service driven, advanced analytics are required to manage workload requests, placements, and migrations so as to maximize the use of CPU, memory, storage, and network resources within a private cloud. CiRBA provides the workload-aware predictive analytics solution with a number of important capabilities, including:</p> <ul style="list-style-type: none"> • Maintaining performance by balancing infrastructure supply and application demand • Reducing infrastructure costs by increasing VM density and

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			<p>infrastructure resource utilization</p> <ul style="list-style-type: none"> • Improving IT staff productivity by codifying operational policies and automating many formerly manual workload provisioning and migration tasks • Minimizing software license costs by optimizing the number of active licenses needed to support specific workloads and business processes • Reducing risk by providing a mechanism to automatically enforce compliance with key business and operational policies
Q24.	Enhanced Services	What would you propose as a good business case for virtualizing the desktop (offering VDI)?	<p>VDI Business Case</p> <p>When exploring a virtualized desktop environment, we recommend the Commonwealth consider including the following components in the business case:</p> <p>When exploring a virtualized desktop environment, we recommend the Commonwealth consider including the following components in the business case:</p> <ul style="list-style-type: none"> • Storage strategies • Software licensing costs • Complexity and size of environment • Deployment timeframe • Bring Your Own Device (BYOD) support • Security • Connect to multiple secure data sets within a customer data center from a provider managed facility • Customizable configurations – ability to tailor different images for different types of users and company departments • Dynamic personal sessions – when you log in from any device the user has a consistent desktop view • Integrated offline access – ability for the user to work online or offline • Integrated backup and recovery capabilities <p>VDI Capabilities</p> <p>IBM is well versed in Virtual Desktop Infrastructure technologies. We</p>

Ref#	Category	Question	Supplier Response
			<p>offer a complete portfolio of Virtual Desktop Infrastructure (VDI) services and solutions to our clients globally under our Mobile Virtualization Services (MVS) service offering. Our VDI capabilities include solutions based on private or public cloud, on premise, multi-tenant, and / or hybrid cloud implementations. We can provide the infrastructure, use the existing infrastructure, or even take ownership of an existing asset and deliver a complete “as a service” model to the client, moving from a CAPEX to an OPEX delivered solution.</p>  <p>The diagram illustrates three VDI models: <ul style="list-style-type: none"> Pooled Desktop: Uses a single 'GOLD' image for multiple virtual machines (PCs) on server hardware. It features shared images, centralized shared storage, and non-persistent data. Dedicated Desktop: Uses dedicated private images for each end user. It features centralized shared storage and persistent data. Shared Published Desktop: Uses server-based computing with centralized shared storage. It hosts Windows applications on a server farm, where published desktops are applications provided by the server farm, and data is non-persistent. Below the models, the diagram shows 'End User Data' and 'Application User Data' layers, with 'Published Applications' and 'Streamed Application' at the bottom. </p> <p>Figure 10: Virtual Desktop Infrastructure (VDI) Example</p>
Q25.	Data Center LAN	<p>What do you recommend as the best demarcation point between the Data Center LAN and the Network or WAN? The Commonwealth wants to make the cleanest scope separation for a future WAN Network RFP.</p>	<p>Most enterprises supporting critical application workloads integrate multiple providers for data center services. They also recognize the need to have clear end-to-end visibility including the status of secure internal and external connectivity. In general to provide flexibility and adaptability within the Data Center infrastructure, the data center LAN equipment and support is often physically separate from the WAN equipment and support. Many WAN providers include the equipment necessary to optimize the network traffic in their solutions and interface to their client’s specific LAN environment. The LAN infrastructure and support is then tailored with security, manageability, and flexibility in mind to support the required</p>

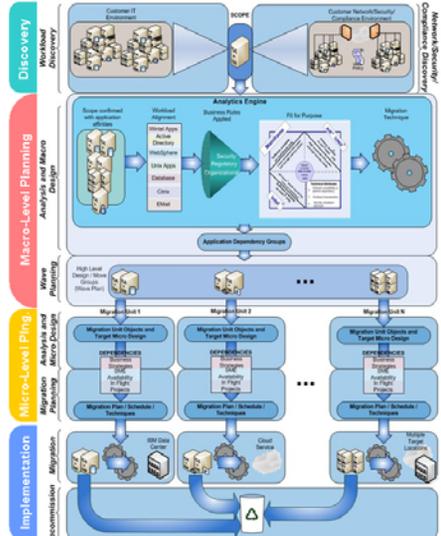
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			<p>workloads. Segregating the entrance/egress of WAN circuits physically from the tightly controlled internal traffic flows can leverage efficiencies in circuit provisioning options (ex. Internet, Switched Ethernet or MPLS/Dedicated) while also enhancing the internal controls for secure and flexible internal LAN connections.</p> <p>With the advent and availability to leverage Software Defined Networking (SDN) functionality, and the proliferation of virtualization to provide virtual switches and virtual firewalls, the above mentioned demarcation points while important are not as critical as a clearly defined Service Responsibility Matrix showing roles and responsibilities. We recommend at a minimum an alignment of responsibilities between defining the architecture, the provisioning of services, and implementation and on-going support for each provider along with committed service levels.</p>
Q26.	Data Center LAN	In the current RFI, the Commonwealth has bundled Data Center LAN services (e.g., switching, routing, load balancing and firewall) with Server and Storage services. Do you find any challenges, issues, or concerns with this approach and why? Any recommendations?	<p>This is the most common approach and allows efficiencies over multiple platforms that may be present in the data center. It reflects the tightly coupled nature between workload processing at the server level, both physical and virtual, and inherent dependencies upon a secure computing infrastructure including storage and connectivity. Newer virtualization and orchestration options can be leveraged in unison with the LAN. Some examples include extending VLANs and network functions such as load balancing and firewalls into the network fabric. The suggested alignment to server and storage services is in line with future Data Center designs that offer secure but flexible computing options.</p> <p>It is possible to have multiple providers, but that would increase the complexity of integration between tools and processes. An ITaaS solution may offer the best combination of flexibility and efficiency.</p>
Q27.	Data Center LAN	The Commonwealth did not bundle Data Center LAN services (e.g., switching, routing, load balancing and firewall) with the Data Center Facility services (e.g., HVAC, power, raised floor). Do you believe this is the correct approach? Do you have any recommendations?	<p>This is a common approach and allows the physical data center provider to utilize the organizations assets, supporting tools and processes to deliver an efficient facility platform in support of the computing effort. Both Data Center Facility and Data Center LAN services require tight integration of processes, especially in the Change Control area. The ability to apply quality facility services for example as described with focused skills and expertise (e.g., understanding</p>

Ref#	Category	Question	Supplier Response
			<p>physical building capabilities or limitations, adherence to local building codes) is critical. To leverage these insights and expertise, we suggest while not bundled that Facility Services be directly involved in any subsequent Change Control or architecture design governance discussions.</p> <p>It is possible to have multiple providers, but that would increase the complexity of integration between tools and processes. An ITaaS solution may offer the best combination of flexibility and efficiency.</p> <p>Due to the inherent complexity in having multiple providers and resulting complexity of integration between tools and processes. An ITaaS solution may offer the best combination of flexibility and efficiency.</p>
Q28.	Data Center LAN	The Commonwealth is considering decoupling the Data Center Facility services from the Server, Storage, and Data Center LAN services. What do you think of this approach? What do you think are the advantages, disadvantages and tradeoffs of splitting the facility services out versus coupling these services with Server, Storage, Data Center LAN?	<p>As noted in our response to question Q27, this is a common approach and allows the physical data center provider to utilize their organizational assets, supporting tools and processes to deliver an efficient facility platform in support of the computing effort. That effort includes Server, Storage, and Data Center LAN services. Direct involvement in Change Control or architecture design governance discussions is a key element if decoupled. The advantages again are in the ability to apply quality, focused skills and expertise. Leveraging this expertise and thorough vetting of changes to the computing environment with all constituents can remove risk of de-coupling and enhance the overall end processing state.</p> <p>Due to the inherent complexity in having multiple providers and resulting complexity of integration between tools and processes. An ITaaS solution may offer the best combination of flexibility and efficiency.</p>
Q29.	Data Center LAN	Supplier is expected to provide centralized Data Center LAN services. Should LANs in non-centralized Data Centers be part of the scope for Data Center LAN services or bid as part of Network/WAN in a future procurement? What would be the pros/cons and tradeoffs?	<p>We suggest all LAN support remain consistent and under one provider that also provides support for the server and storage infrastructure. This decreases the complexity of integration of the tools and processes and enhances control. It provides benefits such as ensuring standards are consistently implemented across all services and can allow greater ease in obtaining end-to-end visibility and control or extending common features to extended LANs under one control</p>

Ref#	Category	Question	Supplier Response
			<p>point.</p> <p>It is possible to have multiple providers, but that would increase the complexity of integration between tools and processes. An ITaaS solution may offer the best combination of flexibility and efficiency.</p>
Q30.	Data Center LAN	If the solution includes new Data Centers, who should provision and manage the network connections between the Data Center locations? Should it be the Network Provider, the Data Center Provider or the Server, Storage, Data Center LAN Provider?	<p>A typical approach is for the Network Provider to manage the connectivity between sites as they can provide efficiencies through use of standard tools, processes, and operations management. The requirements for connectivity however should be defined and set by the responsible Server, Storage and LAN provider. These requirements are normally vetted during the ITIL Service Design process stage or as part of the overall architecture and service delivery governance model. If the new Data Center is procured as a hosting facility, added as part of an acquisition, or newly built, our responses to Q3 & Q4 also point out the value of including the Facility resources in the conversation with regard to network provisioning and entrance/egress requirements.</p> <p>Due to the inherent complexity in having multiple providers and resulting complexity of integration between tools and processes. An ITaaS solution may offer the best combination of flexibility and efficiency.</p>
Q31.	Data Center	How does the Supplier propose to migrate Server, Storage, Data Center LAN services out of the CESC datacenter by June 2019 or earlier? Describe how the Supplier would seamlessly migrate out of CESC like-for-like, transform to new services, or a combination of the two? What are the recommended approaches?	<p>Data Center Migration</p> <p>IBM's approach for data center migration is based on reducing the time and minimizing the risk associated with moving server images from one data center to another. IBM working together with the Commonwealth will determine the best time to take advantage of technology refresh where possible, to eliminate the need for bubble equipment and reduce stranded asset.</p> <p>IBM's Data center migration method divides the migration of workload into multiple phases, each with a defined start and stop, which enables teams to logically segment work and apply the right resources to the tasks. The method includes the following steps:</p> <p>Discovery</p> <p>Discovery is an imperative phase in the workload migration, which requires two approaches to ensure each of the elements are</p>

Ref#	Category	Question	Supplier Response
			<p>understood. We use an automated approach to identify the system's view of the environment, this include what systems talk to other systems. IBM uses automated tools to discovery the physical environment and the logical affinities among the various applications and servers. This is accomplished using our Application Workload Study (AWD). This helps to define each infrastructure component required and the technical requirements are needed to begin designing the target environment.</p> <p>The other approach is the business view, which includes understanding some of the non-functional requirements for the systems such as the criticality of the workloads, their regular outage windows, grey out or blackout periods, and so forth. We will work with the Commonwealth business users to develop a deep understanding of the systems and how they relate to the business. The Migration team will work alongside the support team to develop an understanding of the systems based on the day to day support that is performed.</p> <p>Analysis and Design</p> <p>Analysis and design is the consumption of all the discovered information. During this phase, the target environment is validated, which in our solution is IBM data center. The application affinities are understood, which enables architects to begin design the targets. Once validated, the configuration is designed to ensure the details needed for the systems to function in the new environment are included in the final architecture. This includes items such as network interface card speeds, Active Directory requirements, firewall rules and other details. At this stage, IBM begins ordering additional hardware, validating the migration techniques and ensuring the baseline assumptions are correct.</p> <p>Wave Planning</p> <p>The wave planning phase is designed to take the results from the discovery phase, the target design created during analysis and design and the migration techniques to determine the groupings in which the systems will be migrated. The systems are broken into groups based</p>

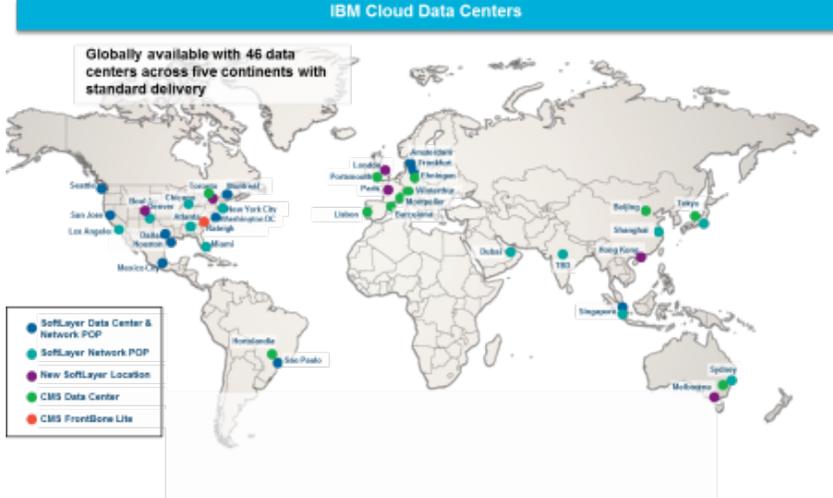
Ref#	Category	Question	Supplier Response
			<p>on the migration techniques and approach. For instance, systems that are being virtualized or migrated using a SAN to SAN technique will be grouped together. Once that grouping is created, they are further broken down by application affinity group, which defined the move grouping, which would be a set of systems that migrated in a single migration event, typically a weekend.</p> <p>Migration</p> <p>Migration has three sub-phases: Migration Planning, Migration and Decommission.</p> <p>The migration planning sub-phase describes the actual steps needed to execute the migration. This gives all the participants an opportunity to perform a dry run of the activity to ensure everyone understands their role in the final execution. All of the details needed to move the systems are validated to be in place, which includes the temporary elements that are necessary, such as any additional WAN links, IDs, and drive space. This is when the actual runbooks for migration are generated and validated, which documents as a command level, everything a technician will be running on a system to move it to the new location.</p> <p>The migration itself is the event when the teams come together to perform the actual migration of the workload, this includes teams from networking, system administrators, virtualization experts, project managers and operations groups. The teams create a war room to track and monitor the progress of a migration, enabling a direct line of sight to the Commonwealth on the progress during the event. Any problems that come up are immediately dispatched to the correct personnel for immediate resolution during the event to fix forward to ensure a successful migration. During the migration, end users are enabled to perform their user acceptance tests after IBM validated that the systems have checked out based on their initial runbook. This validates that systems are up and running, data is as expected and the end-users are happy with the results of the migration.</p> <p>Decommission is the final sub-phase, which is where the Commonwealth and IBM work together to fulfill the expected steps</p>

Ref#	Category	Question	Supplier Response
			<p>for decommissioning. During this time, all temporary data is properly destroyed, systems are turned off to allow for data retrieval if needed, and plans for hardware reclamation is made. At this point, lessons learned are fed back into the team for all subsequent move events to drive continuous improvement throughout the overall program.</p> <p>IBM Migration Factory</p> <p>IBM’s Migration Factory is a server workload transformation offering that deploys the approach described above and is designed to optimize application workloads and data and deploy on a public, private, traditional, or hybrid environment.</p> <p>This migration factory will be priority-driven, delivering the best value in terms of cost and performance to the business. This factory method includes all aspects of the migration factory including analysis, architecture, planning, execution and deployment.</p> <p>IBM Migration Factory Key Activities</p> <ol style="list-style-type: none"> Automated Workload Discovery <ul style="list-style-type: none"> Collect data about environment, application affinity, server utilization Network configuration and security Populate SCOPE database Macro Level Planning <ul style="list-style-type: none"> Understand constraints, apply analytics engine Create conceptual/physical solution definitions, and application questionnaires Create application dependency groups and initial wave plans Micro Design and Detailed Planning <ul style="list-style-type: none"> Understand constraints, apply analytics engine Create conceptual/physical solution definitions, and application questionnaires Create application dependency groups and initial wave plans Implementation <ul style="list-style-type: none"> Create detailed migration schedules, deploy equipment at the target locations Execute the migration plans, certify readiness, cutover Decommission equipment as required at the source locations  <p>Figure 11: Migration Factory Key Activities</p> <p>This process produces a prioritized list of suitable workloads for migration to cloud as well as the estimated costs, risks and impacts. It typically takes about three months to complete the Discovery phase, and another two months to complete the first wave planning and</p>

Ref#	Category	Question	Supplier Response
			<p>design. About five or six months after the project begins, the initial applications will be ready for validation and production deployment. This is well within the VITA deployment target date of January 2019.</p> <p>A transition and migration plan would be developed as part of solution development. Our typical approach includes the transition of managed services, transformation of the IT solution, and physical migration/consolidation in waves to support the proposed solution. Our recommendation is to develop the solution outcome and assess, plan, and execute the migration as part of the overall transition and transformation.</p>
Q32.	Cloud Services	The Commonwealth is interested in a solution that integrates traditional hosting services with new private, community, and public cloud offerings. How do you propose integrating these services?	<p>IBM’s Cloud Strategy – Integration</p> <p>IBM enables the use of hybrid clouds through our IBM Cloud Orchestrator and Dynamic Hybrid Services (DHS), which allows the provisioning and end-to-end management of on premise and off premise clouds from a “single pane of glass” portal. We are delivering our cloud services from world-class, global cloud data centers with the enterprise class security that our customers require. For our IBM managed services customers, we are integrating our clouds with managed services and hosting delivery services, enabling our on and off-premise cloud solutions to be an extension of traditional infrastructure already supported by IBM managed services.</p> <p>Dynamic Hybrid Services (DHS)</p> <p>IBM uses DHS to implement and integrate the key components required for the transformation and transition to cloud. DHS is a capability specifically developed to support VITA’s migration to cloud based IT service delivery, acknowledging:</p> <ul style="list-style-type: none"> • Hybrid Cloud is the reality • Managed services are required • Agility is the norm • Automated service management is foundational <p>To address these items, DHS is defined as a combination of Technology assets and Process services that make up a standard service catalog. DHS Technology assets are comprised of two components:</p>

Ref#	Category	Question	Supplier Response
			<ul style="list-style-type: none"> • Patterns: Patterns support the automated provisioning and orchestration of cloud workloads supporting technologies based on a set of pre-defined attributes (e.g., Operating System, Middleware, and Database) • Pattern Extensions: Pattern Extensions link deployed cloud workloads to existing SO tools, processes and workflows to maintain and enhance the Service Management life cycle <p>The DHS Process services are influenced by changes and enhancements to the IT Operating Model and related Services Management processes. DHS Process Services include:</p> <ul style="list-style-type: none"> • Re-engineering specific processes from both the VITA and IBM SO delivery point of view • Establishing a new streamlined Governance model that is “fit for purpose” to the cloud • Reorganizing and restructuring roles based on automation, cloud and self-service competencies
Q33.	Cloud Services	<p>What would be the best practice with regard to Suppliers owning the cloud contracts and potentially transferring that contract to the Commonwealth? Should the Commonwealth own that contract outright? Are there any other alternatives to be considered?</p>	<p>Best practice regarding Suppliers owning the cloud contracts and potentially transferring the contract to the Commonwealth</p> <p>Where IBM has a Reseller Agreements with the Cloud providers, IBM can own a contract outright with the provider and "resell" the Cloud Services to the Commonwealth. The benefits of this approach include:</p> <ul style="list-style-type: none"> • The Commonwealth only deals with IBM as the enterprise-wide provider. IBM delivers and manages all Services and subcontracted providers (e.g., AWS; Azure) under the Agreement. • Reporting for all Services is captured, consolidated and summarized by IBM. • Quality management over the cloud providers as well as screening of invoices to validate they are in conformance with the Prime Agreement between IBM and the Commonwealth <p>At the end of the term of the Prime Agreement, IBM can work with the Commonwealth and the applicable cloud provider to assign the existing subcontractor agreements to the Commonwealth.</p> <p>Commonwealth contract ownership with the cloud providers</p>

Ref#	Category	Question	Supplier Response
			<p>The Commonwealth can own the contracts outright with the cloud providers. The benefits of this approach can be much the same as IBM owning the contracts. IBM can take over operational responsibility of the contracts ("Managed Contracts") where IBM will provide the oversight and management of the cloud provider's services; the Commonwealth can pay the providers directly or IBM can act as payer on the Commonwealth's behalf using a Commonwealth account. This approach would allow the cloud services to be managed by another vendor upon expiration of the Prime Agreement.</p> <p>Alternatives to be considered</p> <p>The terms and conditions of each cloud provider's agreements for use of their services are available for inspection at their respective on-line portals. These terms are substantially different from traditional outsourcing agreements, especially in the areas of SLAs, limits of liability, termination rights by both parties, etc. If the Commonwealth chooses AWS or Azure for example, regardless of who owns the contract (IBM or Commonwealth), the terms found on the provider's then-current portal would provide the Commonwealth all its rights and obligations as to those cloud services, they would "flow up" from the provider to the Commonwealth. IBM's SoftLayer Cloud Services has competitive terms and conditions as compared to our competitors. However, using IBM SoftLayer as the provider will allow the broader IBM to stand behind these services with enhanced SLAs, limits of liability, etc., since we have direct control over the delivery of services. In any event the Commonwealth should carefully consider the terms of all providers, IBM would be happy to assist the Commonwealth in that evaluation.</p> <p>IBM Gravitant is a Cloud Brokerage Service IBM can employ as part of the Prime Agreement on behalf of the Commonwealth. Gravitant objectively considers the client's required services, growth and other strategic client variables, and provides a roadmap of a selection of multiple vendors who collectively optimize the service requirements of our clients. At the Commonwealth's direction, IBM can employ Gravitant as part of the overall IBM solution.</p>
Q34.	Cloud Services	When the Commonwealth buys cloud services offerings	There are multiple ways to manage data on behalf of the

Ref#	Category	Question	Supplier Response
		<p>how do you propose to identify where the data and services are located?</p>	<p>Commonwealth. We have options for data services that can reside directly in the cloud data center environment. The bottom line is the Commonwealth control where the data resides.</p> <p>As illustrated in the figure below, we have 46 cloud data centers worldwide. We will work with the Commonwealth to identify the US location that addresses your business needs.</p>  <p style="text-align: center;">Figure 12: IBM's Cloud Data Centers</p>
B. Financial/Server Storage			
Q35.	Pricing Structure	<p>The Commonwealth is interested in creating the best possible pricing structure for the Services. In light of that fact, Supplier is invited to both comment on the structure described in Exhibit 4.1 and 4.2, and to propose an alternate pricing structure if they believe that it will better serve the interests of both parties. The Commonwealth will contemplate any proposed pricing structure along five dimensions:</p> <ol style="list-style-type: none"> 1. Predictable: To the greatest extent possible, customers should be able to forecast charges ahead of time; changes in pricing that occur over 	<p>The Resource Unit (RU) structure VITA is proposing with ARC and RRC is an industry standard approach designed to achieve predictable, manageable, fair and flexible pricing.</p> <p>Incentives are situational specific. IBM can work with VITA to design a charge-back method and milestones that will incentivize desired stakeholder behaviors. This may mirror IBM pricing or utilize a different structure.</p> <p>IBM also has the ability to offer VITA the opportunity to structure a Cloud Solution or an infrastructure as a service offering:</p> <ul style="list-style-type: none"> • Public Cloud: A solution would be built in a shared IBM data center. IBM would own the hardware and VITA would have the

Ref#	Category	Question	Supplier Response
		<p>time should not be a surprise.</p> <p>2. Manageable: The pricing should not be so complex that it is needlessly difficult to administer. If quantities of work or equipment in the environment must be measured, then those quantities should be as easy and transparent as possible to measure.</p> <p>3. Fair: The service pricing must be a reasonable proxy for a services provider’s underlying costs and should adequately recover those costs. Additionally, to the extent possible, the party that causes any incremental cost should bear that cost.</p> <p>4. Incentives: All pricing structures will incentivize certain behaviors and discourage others. The goals of the sourcing program must be kept in mind when considering the behaviors that might be driven by a pricing structure. For example, a goal to encourage server consolidation might include reduced cost at a centralized data center.</p> <p>5. Flexible: As consumption moves up and down, the charges should also adjust. Technology is an evolving industry, and the ability to turn down an old service to turn up a new service is one of the benefits of an efficient IT sourcing agreement. Such adjustments may include minor volume changes month to month, significant scope additions, reductions, or terminations, and ability of large service providers to re-deploy investments.</p>	<p>ability to rapidly scale up or down.</p> <ul style="list-style-type: none"> • Infrastructure as a service: IBM would own the hardware and provide the hardware and services to VITA in an all-inclusive resource unit.
Q36.	Inventory and Volume Collection	The Commonwealth is interested in introducing new Resource Units that do not exist in the current contract; in order to fairly compensate Supplier for service delivered, and support the other goals described in	IBM can implement Application Workload Study, an advanced discovery tool to collect, analyze and verify inventory data. This tool can be implemented and run before, during or post RFP process. IBM typically leverages the ARC/RRC methodology to adjust pricing to

Ref#	Category	Question	Supplier Response
		question 36, Supplier is asked to describe their experience and approach to collecting and verifying volumes both before and after contract signing, and the approaches they use to adjusting financials in the event that the initial count is incorrect. For example, today database support is provided by the Supplier, but is not separately billable. The Commonwealth sees an advantage to separating out database support and making it a separate chargeable unit, how would the service provider collect and verify the volumes to support this chargeable unit?	<p>accommodate significant changes in RU baselines.</p> <p>IBM is also open to adding additional RUs which may be needed as new technology develops. Migration to new RU should result in lower cost for the same services.</p> <p>RU baselines can be adjusted post signing when actual baselines have been established with appropriate sampling of usage.</p>
Q37.	Asset Ownership	The Commonwealth consumes certain services today which are underpinned by a set of assets (servers, firewalls, etc.). The Commonwealth (or their designee) has the right to acquire these assets. The Commonwealth has a desire to consume services; rather than own assets, and envisions Supplier acquiring these assets and using them to provide services back to the commonwealth. Please describe experiences acquiring assets from an incumbent, and also describe your recommend financial treatment of their cost recovery for these assets.	<p>IBM is open to purchase assets from the incumbent that are required for service delivery. These assets would be purchased from the incumbent at fair market value or leases assumed and billed back to VITA through the HSC methodology over 36 months.</p> <p>IBM will incorporate storage hardware into the RU pricing.</p>
C. Managed Security			
Q38.	Security	The Commonwealth's Managed Security description of services includes all the required scope bundled for a single experienced Security Supplier. Do you see any challenges or issues with this bundled model?	IBM does not see a challenge or issue with this approach. In our view, having a single Service Provider support infrastructure and centralize log collection, analysis and reporting allows for a more unified approach with a single point for information and correlation activities.
Q39.	Security	Do have any concerns or recommendations regarding how to scale Managed Security Services to organizations of the size and complexity of the Commonwealth?	<p>IBM scales its support structure as needed to address the needs of multiple large enterprise environments. We are able to rapidly deploy additional services and devices to address your enterprise or specific agency needs as required to support critical functions. IBM also has experience scaling tools infrastructures to reliably support evolving needs due to changes in the size or complexity of your environment.</p> <p>As we learn more about the specific tools and infrastructure that exists today, we will be able to identify points of concern around available</p>

Ref#	Category	Question	Supplier Response
			licensing or device capacity issues.
Q40.	Security	Can you provide examples of comparable environments where you offer security services similar to those required by the Commonwealth?	<p>Several examples of comparable environments are highlighted below.</p> <ul style="list-style-type: none"> • A regional bank in the southeast utilizes Managed Security Incident Event Monitoring • A large bank in New York City utilizes Managed Security Services for Threat Management in their Security Operations Center • A state government in the Midwest uses SIEM optimization services to enhance their shared service model SOC.
Q41.	Security	Have you supported Managed Security services in distributed environments - both physical and virtual including on premise and off premise implementations?	Yes, IBM has provided this support. We have the ability to remotely manage security infrastructure devices (physical + virtual) in your Data Center or any hosting facility you may select, provided we can connect via the network.
Q42.	Security	Do you offer solutions supporting geographically diverse locations (e.g., remote location with satellite)?	Yes, we can support geographically diverse locations. IBM provides remote management and support for any managed device provided it is accessible over the network (VPN terminating into corporate environment or directly to device).
Q43.	Security	How have you implemented solutions similar to those in the Commonwealth making use of a centralized federated environment?	Yes. IBM has deployed and supported major and complex solutions leveraging our centralized SOC as well as dedicated (on premise) resources to satisfy customer needs. We can combine the use of remote and dedicated support personnel to take advantage of scales of efficiency to provide you with a cost effective proposal.
Q44.	Security	What do you consider to be the key challenges and tradeoffs for the implementation of Managed Security Services in an environment similar to the Commonwealth?	<p>In a large, complex environment such as the Commonwealth, the definition of requirements can be a challenge. We have found that many organizations, such as VITA, invest significantly in security tools and platforms, yet lack the staffing to properly consume the vast amount of data that emerges. Many times there is also a lack of a comprehensive plan of action to perform based on the output of these tools and platforms.</p> <p>IBM has clearly documented detailed plans on the required outcomes from each tool/service and the required vendor/client responsibilities are key to success. We believe that having a detailed design and plan for your security operations will be a key to success prior to implementation of security tools.</p>

Ref#	Category	Question	Supplier Response
Q45.	Security	What do propose at a high level to be the key strategies and implementation elements of any typical security services solution migration?	Initially we document in full detail all systems and platforms in scope for migration. Understanding not just the technology, but also the criticality within the environment and within the business practice. Once the environment is well understood and documented, a phased plan on migration will be developed. This plan will include actions during maintenance windows, but also as much prep work as possible outside maintenance windows to ensure a smooth and quick migration. This allows for a smooth transition to IBM services while minimizing, and often eliminating system downtime and production impact.
Q46.	Security	Can you recommend additional Managed Security Services that are not currently included or considered in the scope of described services?	VITA's RFI is comprehensive in that it addresses the wide array of controls that would be expected in an environment of your size and complexity. When we have a better understanding of the services in place today, the currency of technologies and the design of your network, we can determine if you would benefit from IBM's Security Risk & Design Assessments, Analytics, Remote Forensics and Consulting Services.
Q47.	Security	Based in your experience, what are the key challenges with regard to the regulatory requirements included in the scope of services? Do you have any recommendations based on your experience?	One of the key challenges for a statewide IT program is the spectrum of regulatory requirements among the various agencies that make a centralized information security program challenging. Each and every agency will have their own set of regulatory requirements depending on services provided, data classification types, and communications to federal entities (IRS, CMS, or SSA). In situations like this, it is important to create a baseline of controls that are NIST standards (SP800-53) based and to utilize the Cyber Risk Framework as the core of the Information Security program. The majority of federal regulatory requirements of data are derived from NIST controls. A cross walk matrix of controls should also be documented how this standard will meet safeguarding data like, for example, FTI or HIPAA. Other standards like PCI should also be covered with commercial standards. Another area of importance is pragmatic risk management versus a purely compliance program. As attacks from organized crime and nation state sponsored actors grow, a system of protective and

Ref#	Category	Question	Supplier Response
			<p>detective controls need to be designed against the cyber threat rather than compliance correctness.</p>
Q48.	Security	<p>Do you have any guidelines or best practices regarding whether the various Managed Security Services are better off being remotely hosted or on premise?</p>	<p>We currently manage Security Services for very large and complex environments from our Global SOC. We've found that this is a cost effective way to manage an infrastructure as we're able to effectively leverage the skills of our personnel as needed in support of routine and atypical events.</p> <p>Locating security devices or functions remotely or on premise may require discussion with business and application owners to determine if a remote solution is appropriate. The primary consideration may revolve around the sensitivity of or type of data that may exist in an off-premise approach. Services such as Network IDS are most effective within a DC premise however a service such as URL or Content filtering may function best hosted in the cloud.</p> <p>We will actively consider off-premise (or cloud based) options as we gain a greater understanding of your WAN and Data Center configuration.</p>
Q49.	Security	<p>Do you think you would be able to provide all the described Managed Security Services yourselves or will you require to subcontract any services to other third parties?</p>	<p>Yes. IBM can provide the Managed Security Services described in Exhibit 2.1.</p> <p>Subcontractors</p> <p>While we expect to be able to provide direct solutions to all components, there may be components where we leverage a partner/subcontractor relationship for enhanced skills for a specific platform. We will continually assess any proposed solution approach as we learn about in-place technologies as well as the location and sensitivity of data that may reside on dedicated or shared infrastructure.</p> <p>The use of subcontractors will be determined based on the final solution selected by VITA will depend on how the solution is finally structured.</p> <p>Managed Security Services</p> <p>Managed Security Services are a core competency for IBM. We offer tools, technology and expertise tools to meet your Security requirements.</p>

Ref#	Category	Question	Supplier Response
			<p>We are recognized as an industry leader as noted in the December 23, 2015 Gartner Magic Quadrant Report, ID G00273932.</p> <p>Magic Quadrant</p> <p>Figure 1. Magic Quadrant for Managed Security Services, Worldwide</p> <p>Source: Gartner (December 2015)</p> <p>Figure 13: Gartner Recognizes IBM's Leadership in Managed Security Services (2015)</p>
Q50.	Scope Demarcation	VITA is interested in identifying the most efficient demarcation or bundling of these services between RFPs. For example, perhaps it would be more efficient to separate the Data Center facilities from the other Server services; or perhaps it would be better to include some or all of the Security services with the Server RFP.	<p>Scope Demarcation Recommendations</p> <p>From a security perspective IBM believes that the current demarcation of services is logical with the exception of data center firewalls. We view firewalls as a security device which we monitor and manage in concert with network intrusion detection appliances. Where logical, we recommend using Unified Thread Management (UTM) appliances.</p>

Ref#	Category	Question	Supplier Response
		Please provide any further experience or suggestions regarding scope demarcation between potential RFPs.	Breaking apart FW and NIDS support in these instances invites more than one entity managing an appliance. Our concern is that using multiple entities invites gaps.
D. Financial/Managed Security			
Q51.	Pricing Structure	<p>The Commonwealth is interested in creating the best possible pricing structure for the Services. In light of that fact, Supplier is invited to both comment on the structure described in Exhibit 4.1 and 4.2, and to propose an alternate pricing structure if they believe that it will better serve the interests of both parties. The Commonwealth will contemplate any proposed pricing structure along five dimensions:</p> <ol style="list-style-type: none"> Predictable: To the greatest extent possible, customers should be able to forecast charges ahead of time; changes in pricing that occur over time should not be a surprise. Manageable: The pricing should not be so complex that it is needlessly difficult to administer. If quantities of work or equipment in the environment must be measured, then those quantities should be as easy and transparent as possible to measure. Fair: The service pricing must be a reasonable proxy for a services provider's underlying costs and should adequately recover those costs. Additionally, to the extent possible, the party that causes any incremental cost should bear that cost. Incentives: All pricing structures will incentivize certain behaviors and discourage others. The goals of the sourcing program must be kept in mind when considering the behaviors that might be driven by a pricing structure. For example, a goal to encourage server consolidation might include 	<p>The pricing structure is good and appears to be well thought out. We would ask that you let us add additional units of measure for some of the resource units when we provide our response to the RFP. Some examples would be:</p> <ul style="list-style-type: none"> For Security Monitoring, Log Management, & Analysis we would also want to measure and bill by the events per second being monitored. We would also want to provide a number of very specific ARCs for this service such as a cost for additional use cases beyond some base number. For Managed Network Intrusion Protection as an option to the amount of bandwidth protected we would want to charge by the number of IPS devices managed. The device capacity would be a function of the appliance deployed. <p>We noted that the following items require input regarding the unit of measure:</p> <ul style="list-style-type: none"> eDiscovery Tokenization Platform Managed Encryption Platform Source Code Scanning

Ref#	Category	Question	Supplier Response
		<p>reduced cost at a centralized data center.</p> <p>5. Flexible: As consumption moves up and down, the charges should also adjust. Technology is an evolving industry, and the ability to turn down an old service to turn up a new service is one of the benefits of an efficient IT sourcing agreement. Such adjustments may include minor volume changes month to month, significant scope additions, reductions, or terminations, and ability of large service providers to re-deploy investments.</p>	
Q52.	Inventory and Volume Collection	<p>The Commonwealth is interested in introducing new Resource Units that do not exist in the current contract; in order to fairly compensate Supplier for service delivered, and support the other goals described in question 36, Supplier is asked to describe their experience and approach to collecting and verifying volumes both before and after contract signing, and the approaches they use to adjusting financials in the event that the initial count is incorrect. For example, today database support is provided by the Supplier, but is not separately billable. The Commonwealth sees an advantage to separating out database support and making it a separate chargeable unit, how would the service provider collect and verify the volumes to support this chargeable unit?</p>	<p>IBM is open to developing new RU's that may be needed as new technology develops.</p> <p>RU baselines can be adjusted post signing when actual baselines have been established with appropriate sampling of usage and validation of volumes.</p>
Q53.	Asset Ownership	<p>The Commonwealth consumes certain services today which are underpinned by a set of assets (servers, firewalls, etc.). The Commonwealth (or their designee) has the right to acquire these assets. The Commonwealth has a desire to consume services; rather than own assets, and envisions Supplier acquiring these assets and using them to provide services back to the commonwealth. Please describe experiences acquiring assets from an incumbent, and</p>	<p>IBM is open to purchase assets from the incumbent that are required for service delivery. These assets would be purchased from the incumbent at fair market value or leases assumed and billed back to VITA through the HSC methodology over 36 months.</p>

Ref#	Category	Question	Supplier Response
		also describe your recommend financial treatment of their cost recovery for these assets.	

6. FEEDBACK REGARDING RFI DOCUMENTS

Please use the table below to provide commentary regarding specific documents included within this RFI, adding rows as necessary.

Ref#	Document/Section	Supplier Commentary
C1.		
C2.		
C3.		
C4.		
C5.		
C6.		
C7.		
C8.		
C9.		
C10.		

In addition to the documents provided in the RFI, IBM recommends VITA review the attached RFP Development Guide for further insights on creating a comprehensive RFP.



RFP Development
Guide 10-21-2016.do