

Commonwealth of Virginia

Enterprise Architecture

“Common Requirements Vision”

Version 1.1

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Introduction

The broadly stated goal of enterprise architecture (EA) is to create a common and cohesive vision between business and technology leaders regarding: the emerging technology trends and enterprise business strategies that will drive the architecture; the IT requirements derived from enterprise business strategies; the role and definition of the technical architecture that best enables the business needs of the enterprise; and, the migration plan that will move the enterprise from the current to the future architecture.

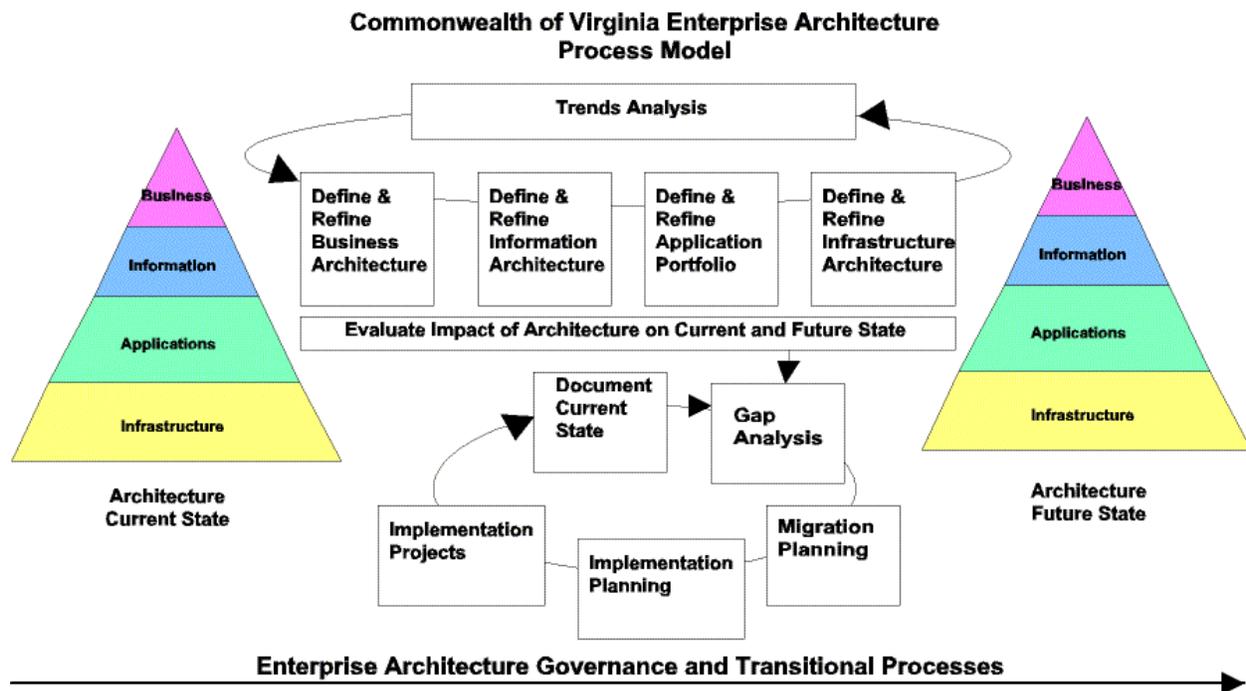
EA does not start with technology. In the Commonwealth of Virginia, it starts with a strategic framework, the vision, goals, priority business activities, and enterprise business strategies of state government. Just as a building must be designed to suit its function and its site, IT must do more than simply address specific operational concerns. The effective use of information technology must be an integral part of the "business of state government."

The primary goal of the Commonwealth of Virginia Enterprise Architecture Initiative is to establish an EA process which is focussed on building and maintaining an enterprise-wide technical architecture (EWTA) that best enables the priority business activities of state government and facilitates the adaptation of technology to the changing, business driven needs of the Commonwealth. The EA supports the Commonwealth E-Government initiative in this way.

As Virginia begins development of our first statewide or enterprise level architecture, the goal is not just to deliver an EA that effectively meets present needs. Our goal is to design an ongoing process that will allow us to continually integrate and synchronize appropriate technologies to best serve the business of state government and the citizens of the Commonwealth. In short, a Commonwealth EA must be highly adaptive, providing continuous alignment between the business of state government and technology.

The following Commonwealth EA Process Model has been designed as a framework for developing Virginia's business driven architecture. Through an evolutionary, iterative process, the current and future state definitions of the architecture are continuously developed, evaluated, and updated in order to assure EA alignment with changing business requirements and emerging technology (upper loop).

At the same time, a managed process must exist for implementing those changes needed to attain the desired future state of the architecture. This governed analysis and implementation cycle supports the evolutionary introduction of new applications and infrastructure components (lower loop).



The Common Requirements Vision (CRV), which documents the business case for the Commonwealth EA Initiative, represents the initial step in the evolution of the process model. The CRV establishes the agreements reached between business and IT leaders regarding: the most significant, influencing trends on the enterprise; the enterprise business strategies that will drive the EA; the information required by the business decision makers to satisfy the enterprise business strategies; implications for application portfolio development; and the requirements for the technical architecture.

Technology Trends (TT)

Technology Trends (TT) are widely recognized forces or patterns of change that can be used to infer or predict the future of technology. The Commonwealth of Virginia Council on Technology Services (COTS) has identified the following technology trends, as having a significant impact on the business and architecture requirements of state government. Specifically, technology trends will influence the delivery of Enterprise Business Strategies (EBS) and frame development of the Enterprise Wide Technical Architecture (EWTA). Of the 25 significant technology trends identified by COTS, 13 were judged to have a critical impact on development of the Commonwealth Enterprise Architecture (EA). The 13 critical trends are listed first in order of priority. COTS, in its assigned role as the Commonwealth EA Steering Committee, will regularly review and update technology trends.

Critical Technology Trends:

TT01. Widespread Access to Internet by Citizens. The availability and acceptance of moderately priced computers, coupled with rapid growth in ISP availability in almost all locations, has led to an increasing number of citizens who use the Internet. The emergence of web-TV and similar devices holds the promise of even greater web access by the majority of citizens in the next few years. Consequently, governments that web-enable their services will be positioned to meet the accessibility demands of their citizens. At the same time, governments must continue to recognize that not all citizens will have access to the Internet. The requirement for other forms of government service delivery will continue.

TT02. Internet and Intranets as Dominant Communications Vehicles. The Internet and Intranets have become the dominant communications vehicle for publishing information and for conducting business in both the public and private sector. This trend will make business solutions that are not compatible with the Internet obsolete. "Internet only" solutions for delivering public services, however, will not completely replace other service delivery mechanisms because many citizens, who are most in need of government services, do not have Internet access.

TT03. Requirement for Secure Transactions Across the Network. As more business-to-business and business-to-customer transactions are processed over the Internet, there is a widespread realization that security is vital. Technologies like encryption, Public Key Infrastructure (PKI) and digital signatures are becoming increasingly viable and reflect the growing demand for absolute authentication, privacy & access control. This growing demand for pervasive security

will drive rapid advances in security technologies and require significant investment by the public sector in proven security systems.

- TT04. Network Centric Computing.** The need to share information and work cooperatively, regardless of time and distance, is causing electronic document handling, electronic commerce, automated workflow and collaborative computing to continue to increase dramatically. Increased use of electronic work processes will escalate the demand for network connectivity and communications bandwidth. This trend elevates the importance of networks and makes them critical factors in the success of business processes.
- TT05. Electronic Commerce Expectation of Business Partners.** Businesses are discovering that electronic commerce is a viable and productive way to transact business across supply chains. Many businesses now require their partners to transact business electronically. Consequently, state and local governments, which are not positioned to conduct electronic business, will find themselves and their citizens at a significant, and potentially costly, disadvantage. The Commonwealth E-Government initiative was created in response to this trend.
- TT06. Emergence of Web Browser as Client of Choice.** The web browser has become a common element on all workstations. Deployment of applications using a web browser as the client is widely acknowledged to be an efficient choice. This approach mitigates problems inherent in client software distribution and synchronization. Web browser enabled applications will become an increasingly dominant method of delivering information, services, and software.
- TT07. Technical Workforce Shortage.** The need for a technically skilled workforce in the public sector will increase with the growth of electronic government. Government must compete with private sector employers for a limited pool of IT professionals. This trend will drive an increasing awareness within government of the need for creative strategies to successfully recruit, train and retain a qualified IT workforce.
- TT08. Standardization on TCP/IP.** Increasingly, the network protocol of choice is Transmission Control Protocol/Internet Protocol (TCP/IP). Because TCP/IP provides interconnection of diverse systems, it is rapidly displacing other protocols on internal and external networks, even though some of these protocols are more efficient.
- TT09. Enterprise Servers.** Just a few years ago, conventional wisdom was that large systems would soon be extinct, to be replaced by networks of small computers. However, mainframe systems have rapidly evolved into enterprise servers with almost unlimited scalability combined with robust management tools, open protocol support, excellent security and high availability. An example is the OS/390

Enterprise Server, which evolved from the monolithic MVS system. Improving price/performance ratios have resulted in enterprise servers becoming the lowest total cost of ownership (TCO) option for many large applications and shared systems. While no single technology choice is the right solution for all needs, this trend will drive continued centralization of computing and data storage resources, and make the central provision of applications as services more attractive.

- TT10. Organizational Dual Discipline Proficiency.** Increasingly, IT professionals need to have a solid understanding of the business and business professionals must be versed in current technology issues and trends that affect their organization. IT has become an integral component of nearly all business processes. The accurate and timely information content of products and services is becoming a critical success factor in most organizations. This encourages organizations to recognize the importance of cross training IT and business leaders. The demand for knowledgeable professionals who understand and can enunciate the business case for technology will continue to be high. Some organizations are deploying technology specialists within business units and business process specialists in IT units.
- TT11. Convergence of Multi-Media Applications and Networks.** Innovations in technology are creating the opportunity to transmit voice, video and data over the same network. For example, video is becoming a common element in many applications. The broadcasting of video, interactive video conferencing, and even conducting client interactions via video is proving to have significant business value. This trend will continue to drive increasing bandwidth requirements and shape both new applications and future networks.
- TT12. Right-Sourcing.** Organizations are continuing to use external providers for selected IT services and for skills transfer into their organizations. The most successful sourcing model retains internal control and oversight of IT, but employs outside experts and facilities for services that the organization does not have or can obtain more economically through outsourcing.
- TT13. Enterprise Portals.** Large, complex organizations, like state government, are increasingly moving away from a multiple web site approach for providing services to a "web portal" strategy, which provides a single gateway to services across the enterprise. Web portals are essentially web sites that provide various types of services in an integrated format. Often, users of a portal can create personal profiles that allow customized views of the information and services available. The use of portals at the enterprise level can benefit both service providers, and the customer, through the leverage of investment in IT resources, and having a single point of entry for all services provided by the enterprise.

Other Significant Technology Trends:

- TT14. Mobile Connectivity.** The demand for mobile connectivity and information access is increasing in response to increased use of laptop computers, Personal Digital Assistants (PDA), web-enabled cellular telephones and similar devices. This demand will drive significant advances in wireless technology and a corresponding need for applications that use next-generation mobile devices.
- TT15. Increasing Use of Data Warehouse Technologies.** The need to accelerate decision-making causes organizations to place lines-of-business operational data into data warehouses that provide enterprise-wide views of information. Powerful graphical user interface (GUI) analysis tools in the hands of decision-makers provide them with immediate access to critical information. This type of processing is being referred to as on-line analytical processing (OLAP) and requires database structures that allow dynamic definition of data relationships. Consequently, large organizations will increasingly deploy data warehousing technologies as separate but complementary to online transaction processing (OLTP) systems.
- TT16. Rapid Technology Change.** As technology changes more rapidly, the business requirements and expectations of users also change rapidly. Technology solutions that are not designed for adaptability can quickly become obsolete, often before they are fully implemented. This trend makes adaptability to change a vital measure of the value of any proposed technology solution.
- TT17. Customized Service Delivery.** Technology now provides the enterprise with the capability of developing client or customer "profiles" and delivering customized services based on these profiles. This trend, which is already a driving force in the private sector, will increasingly influence the manner in which services are provided in the public sector.
- TT18. Continued Growth of OLTP.** There continues to be very strong growth in high volume online transaction processing (OLTP) systems, driven by the equally explosive growth of electronic business activity. These systems often require large-scale processing and data storage, with emphasis on fast transaction processing and positive commitment of transactions in real time. This trend will continue to drive the demand for large systems and high bandwidth networks.
- TT19. Standardization of Desktop Workstations.** The present standard desktop is the web-enabled computer with resident applications or client software. Rapid advances in technology are requiring regular refresh of desktop workstations. Costs of support for this desktop environment are increasing. Initiatives such as Seat

Management and thin client architectures are providing cost effective solutions that bring current technology to the desktop. Enterprise level implementation of standard desktop configurations, coupled with regular technology refresh strategies, will increasingly be employed to gain technical and economic advantage. (COTS Position: Standard desktop configurations are better implemented at an individual organization, not enterprise, level.)

TT20. Application Hosting. As implementation and maintenance costs escalate, organizations are finding that they can take advantage of web-enabled workstations to obtain up-to-date application systems, with regular technology refresh, by subscribing to the application as a service from a large provider. This trend will open significant opportunities for economies of scale for government. It also offers opportunities for state government to make state-of-the-art systems widely available to local governments and citizens, thereby sharing the advantages of technology empowerment. (COTS Position: State government utilization of packaged applications, provided by application service providers (ASP), is generally limited to popular office automation software.)

TT21. N-Tier Computing. The three-tier client server model proved difficult to manage and expensive to implement and maintain. "N-tier" computing models are rapidly replacing this model. N-tier implementations logically separate the database, the application code, the presentation server and the client processing. The number of physical systems involved can be two or more, with multiple parts of the application residing on the same system in many cases. The client of choice is the web-enabled computer with no application software installation required on the client other than plug-ins or helper apps that are downloaded as needed through a web browser. The result of this trend is the rapid obsolescence of monolithic applications and older two and three-tier client server architectures.

TT22. Systems Management and Support. As systems and networks become more diverse and more complex, management costs increase significantly. This will continue to drive the trend towards enterprise focused systems management applications that can span multiple systems and potentially improve reliability, availability, and total cost of ownership.

TT23. Technology Price/Performance Curve. The power of technology continues to improve and the per unit price continues to decline. Consequently, emphasis is increasingly being placed on faster implementation of more robust solutions, rather than on solution choices that are based on optimization of individual infrastructure components.

- TT24. Availability of Packaged Solutions (Buy vs. Build).** The need to rapidly deploy applications, and to keep those applications current with technology changes, is driving the move to purchase packaged applications whenever they answer the business requirement. At the same time, packaged solution vendors are offering more mature software solutions that can meet certain core business needs of state government.
- TT25. Application Development Tools.** *During the January 10, 2000 EA Workshop, COTS removed this technology trend from the list, citing a need for significant rewrite. At least one of the Enterprise Business Strategies (EBS) identified by COTS as an EA driver (Promote Collaboration and Cooperative Systems Development) infers the use of application development tools. A proposed rewrite of this issue will be presented to COTS for consideration at a later date.*

Enterprise Business Strategies (EBS)

Enterprise Business Strategies (EBS), also known as business drivers, are those highest priority strategies that significantly influence programs across the enterprise. In essence, they “drive” the overall business of state government in the Commonwealth. Identifying and prioritizing business drivers is a critical step in establishing the Enterprise Architecture (EA) and documenting a shared or common understanding of the strategies that must be enabled by that architecture. The Commonwealth of Virginia Council on Technology Services (COTS) has identified the following enterprise business strategies as having the most significant impact on the EA requirements of state government. COTS, in its assigned role as the Commonwealth EA Steering Committee, did not attempt to document all of the strategies driving the business of state government, but rather focussed on those strategies that would potentially be the most significant forces for information technology (IT) change at the enterprise level.

- EBS01. Focus on Customer Service.** State government must provide seamless service to all customers of the Commonwealth, whether that customer is an individual citizen, business, or other government organization. Faced with an increasing demand for customer-centric government, driven by service delivery models in the private sector, Virginia must redefine its focus on customer service. Seamless, customer-centric government service implies: information at the time and place and in a format that is most useful to the customer; the convenience of various service delivery options, including self-service; service that is integrated across state government and allows for “one stop shopping” tailored to the customer’s needs (an example is the E-Government policy to present a single face to the public); a robust human, technical, fiscal, and a regulatory infrastructure that delivers customer satisfaction at reasonable cost.
- EBS02. Improve the Quality of Information and Decision-Making.** The fuel that drives the business of the Commonwealth is information. Virginia must continuously strive to improve the quality of information in order to best serve the varied customers of government. Improvement in the accuracy, timeliness, and availability of information will, in turn, facilitate improved decision-making and service delivery in both the public and private sectors of the Commonwealth.
- EBS03. Respond to the Needs of a Growing, Diverse Population.** Pressure from elected officials and a growing, diverse, constituent population will force the Commonwealth to accelerate the implementation of flexible service delivery mechanisms. The use of

technology, such as E-government, must become a cornerstone strategy for the efficient delivery of services in a rapidly expanding economy. Savings derived from the use of technology to improve service delivery to the majority of citizens, can then be directed to effectively serving those Virginia citizens with limited access to technology.

- EBS04. Attract, Manage, and Retain a Highly Skilled Government Workforce.** Improving government service and information delivery to citizens is contingent upon improved human resource (HR) management practices that attract and retain a motivated and highly skilled government workforce. The Commonwealth relies on the skills, knowledge, and technical abilities of front-line employees and their managers to execute core business activities and priority business processes. The workforce must be empowered with the latest technology and training needed to meet the increasing demands from a technically well-informed citizenry. The risks associated with this business strategy are magnified when coupled with extensive learning curves for new employees, the attainment of retirement age for a large percentage of current employees, and strong competition from the private sector.
- EBS05. Balance Freedom of Information with Privacy and Security.** As stewards of public trust, the Commonwealth must ensure the appropriate privacy and security of the vast amounts of information that it controls. Much of the information is personal data collected from citizens. Within the bounds of privacy and security requirements, the Commonwealth must also improve ease of access to public information. The continued, explosive growth of information, coupled with the required balance between privacy, security and access, places an increasing emphasis on technical solutions that enable continued stewardship of the public trust while improving the delivery of government services.
- EBS06. Identify and Encourage Improved Service Delivery Mechanisms.** Improving government service to citizens is contingent upon improved service delivery mechanisms. The Commonwealth must identify and encourage the use, through appropriate incentives, of the most effective and efficient service delivery mechanisms. As an example, government services provided over the Internet may potentially provide better service at reduced cost when compared to other possible service delivery approaches.
- EBS07. Provide a Technically Educated Workforce.** The Commonwealth must empower citizens with the knowledge, skills, and abilities to succeed in a technology based economy. Technology must be incorporated at all levels of education (K-12 and higher education) in order to build a school system that

routinely graduates a technically educated workforce. Incentives should also be provided for the continuing technical education and development of the workforce after graduation. Successful implementation of this strategy can have a significant impact on the economic and social development of the Commonwealth.

- EBS08. Promote Continuous Improvement.** In response to taxpayer demands and funding uncertainties, the Commonwealth must continuously strive to improve the processes and enabling infrastructure that support the business of state government. In keeping with the overarching strategy that business drives technology, Virginia must ensure the continuous realignment and improvement of technology in order to efficiently support the changing needs of citizens and the government that serves them. Continuous improvement and realignment, within the constrained resource environment of state government, implies a focus on: employing proven technologies; identifying and adopting best practices; promoting continuous process evaluation and appropriate reengineering; and, measuring success.
- EBS09. Improve Procurement of Goods and Services.** In order to address the rapid changes in government service delivery demanded by the citizens of the Commonwealth, the resources necessary to implement change must be readily available. State government requires a procurement system that is responsive to rapid change and focused on best value. Movement to an automated procurement process that is fully integrated across state government, while placing increased demands on current infrastructure, will better enable technical innovation that supports improved service delivery to the citizens of the Commonwealth.
- EBS10. Ensure IT Interoperability.** The seamless delivery of government services to the citizen implies both the vertical (within an organization) and horizontal (across organizations) integration of information. A cornerstone of integrated information and service delivery is IT interoperability. The Commonwealth must establish interoperability as a prerequisite for the development of technical infrastructure.
- EBS11. Optimize Service Delivery through Improved Stewardship of Limited Resources.** Technology must be a service multiplier for the Commonwealth. In other words, state government must continuously demonstrate how technology can be applied to improve the efficiency and effectiveness of service delivery for the citizen. In turn, citizens must be able to assess the stewardship of resources by state government.
- EBS12. Promote Collaboration and Cooperative Systems Development.** Many organizations across state government are

engaged in similar, and in some cases identical, core business activities. Promoting cooperative systems development provides the Commonwealth an excellent opportunity to meet common business needs while simultaneously building integrated technical architecture. Cooperative development strategies facilitate the leveraging of resources across government boundaries and the deployment of common service delivery mechanisms

- EBS13. Foster Economic Development.** The development and utilization of technology must foster economic development across the Commonwealth. In essence, Virginia must continue to seek competitive advantage and attract new business and industry by exploiting technology for the betterment of all citizens.
- EBS14. Reduce Gap between Availability and Adoption of Technology.** Public sector adoption of new technology is often hampered by legal, regulatory and procedural restrictions. In order to facilitate the adoption of new technology and quickly improve the quality of service delivery to citizens, the Commonwealth must implement a proactive strategy to rapidly address inhibiting restrictions in law, regulation, and process.

Business Information Requirements (BIR)

The Business Information Requirements (BIR) describe the information requirements in support of the enterprise business strategies. They answer the following questions relative to supporting the enterprise business strategies:

- What information is required?
- Who needs the information?
- When/how often is the information needed?
- Where does the information come from?

BIR01 Comprehensive information about the services provided by state and local government units, including Federal programs delivered through state and local government, must be available to customers across various delivery options and accessible on demand.

BIR02 Information about the services that customers need and expect from government must be available to local and state government service providers and planners.

BIR03 Information about customer's service delivery preferences and expectations should be available whenever service is being delivered to allow personalization of service delivery.

BIR04 Information about quality of service, quality of information provided and customer satisfaction must be available to process owners, information and service providers, planners and legislators to support constant improvement in delivery of services.

BIR05 Information about constraints to government collaboration must be available to service providers, planners and state legislators to remove any barriers and provide customer-centric government.

BIR06 An integrated view of up-to-date planning information and existing and proposed funding sources must be available to citizens and businesses making decisions about their lives and businesses. This information must be accessible to current and prospective residents and businesses at the time decisions are being made.

- BIR07** Integrated information about current and proposed government procurements and needs must be available to vendors and government decision-makers at all levels.
- BIR08** Location information must be associated with services, facilities and other information of interest (including hazards). An integrated view of geographic information from many different sources is required to support important decisions including, which route to take, where to live, where to locate businesses, where to construct facilities or where to offer services.
- BIR09** Information about the needs and characteristics of various population segments that must be made available to state and local government planners and decision-makers, including demographic trends derived from many different sources.
- BIR10** Information about various service delivery mechanisms, and the applicability of these mechanisms to various population segments, is required by government planners and decision-makers to evaluate service delivery options.
- BIR11** Information about what attracts and retains employees is required. This information comes from sources inside and outside of government and must be accessible to HR planners, governmental units making staffing decisions, and legislators making compensation and benefits funding decisions.
- BIR12** Information about the current state of the workforce including worker skills, workforce availability, and retention rates of skilled workers must be available to HR planners, governmental units making staffing decisions, and legislators making compensation and benefits funding decisions.
- BIR13** Information for evaluating the impact of current and proposed HR rules and regulations must be available to HR planners and legislators.
- BIR14** Information about what types of data are being collected and processed, and by whom, is needed to ensure that privacy, security and access policies are being applied.
- BIR15** Information about the privacy, security and access requirements for information specific to customers of government is required by those responsible for securing and providing access to information.

- BIR16** Information about the actual cost of deployment and operation of service delivery mechanisms is required by government planners and decision-makers to assess what can be offered and what incentives are financially justified.
- BIR17** Information about customer acceptance and use of various service delivery options and what incentives will encourage use of cost-effective options must be collected and made accessible to service providers and planners to support constant improvement in customer service and satisfaction.
- BIR18** Information about what knowledge, skills and abilities (KSA) current and prospective employers want and need is required to develop and deploy an educational system that will empower students with the required KSA.
- BIR19** Information about the KSA of current graduates of the Commonwealths public institutions of learning is required to determine the appropriate curriculum, practice and equipment required to ensure a technically educated workforce.
- BIR20** Information about various methods of deploying technology in education, and the success of these methods is required by educators, education planners and legislators.
- BIR21** Information about best practices and proven technology implementation is needed by government decision-makers and lawmakers. This information comes from within and outside government.
- BIR22** Information about goods and services required by state and local governments must be readily available to planners issuing procurements and vendors wishing to provide those goods and services.
- BIR23** Information about available goods, services and providers must be readily available to state and local governments and to procurement planners.
- BIR24** Information about existing and pending contracts must be readily available to vendors and buyers so that state and local government can take advantage of existing contracts.
- BIR25** Information about the utilization of procurement contracts, quantities and cost of goods and services procured, and vendor fulfillment information is required by both procurement planners

and state and local government purchasers. This information must be in a format that can be analyzed to detect trends and make purchasing and vendor acceptance decisions.

- BIR26** Information about current and planned technologies and data integration requirements of participating government organizations is necessary to ensure that appropriate systems inter-operate to provide seamless service delivery.
- BIR27** Information about agreed upon interoperability standards must be available to organizations building or purchasing applications and systems.
- BIR28** Information about government core business activities and supporting systems must be available to IT planners and government decision-makers to enable the identification of opportunities for collaborative development.
- BIR29** Information about the technology needs of current and prospective industries, and how technology can attract and retain businesses to improve the economic well being of the citizens of the Commonwealth is required by planners and implementers of technology infrastructure.
- BIR30** Information about legal and regulatory restrictions that impede the adoption of technology is required by decision-makers and legislators to facilitate appropriate changes in laws, regulations and policies.
- BIR31** Information about the current technology environment must be available to planners at all levels to support a "best fit" technology strategy.

Enterprise Business Strategies / Business Information Requirements (EBS/BIR) Matrix

This matrix shows which business information requirements are derived from, or relate to, which enterprise business strategies. The alignment of the technical architecture with the business functions and strategies of the Commonwealth is a continuous process.

Enterprise Business Strategies	Business Information Requirements									
	BIR01: Information about available services	BIR02: Information about service expectations	BIR03: Information about Customer Preferences	BIR04: Information about quality of service and information delivery	BIR05: Information about constraints	BIR06: Planning Information	BIR07: Information about procurements and needs	BIR08: Location information	BIR09: Information about needs of customer groups	BIR10: Information about delivery mechanisms and applicability to customer groups
EBS01: Focus on Customer Service	◆	◆	◆	◆	◆		◆	□	◆	◆
EBS02: Improve the Quality of Information and Decision Making	□	◆	□	◆	□	◆	◆	◆	◆	□
EBS03: Respond to the Needs of a Growing, Diverse Population	◆	□	◆	□	□	□			◆	◆
EBS04: Attract, Manage and Retain a Highly Skilled Government Workforce										
EBS05: Balance Freedom of Information										
EBS06: Identify and Encourage Improved Service Delivery Mechanisms	◆	◆	◆	□	◆	□			□	◆
EBS07: Provide a Technically Educated Workforce										
EBS08: Promote Continuous Improvement		◆	□	◆	□				□	□
EBS09: Improve Procurement of Goods and Services					□		◆			
EBS10: Ensure IT Interoperability	□		□	□	□					
EBS11: Optimize Service Delivery Through Improved Stewardship of Limited Resources	◆	□	□	◆					□	□
EBS12: Promote Collaborative and Cooperative Systems Development		□	□	□	◆					
EBS13: Foster Economic Development		□				◆		◆	□	□
EBS14: Reduce Gap Between Availability and Adoption of Technology					◆					
Legend: ◆ High Applicability BIR was directly derived from or is critical to support the EBS □ Some Applicability BIR supports the EBS										

EBS/BIR Matrix Continued

	Business Information Requirements															
	BIR11: Information about what attracts and retains employees	BIR12: Information about current state of the workforce	BIR13: Information about impact of HR Rules	BIR14: Information about types of data being collected	BIR15: Information about privacy, security and access requirements of data categories	BIR16: Information about delivery mechanisms and costs	BIR17: Information about customer acceptance of delivery mechanisms	BIR18: Information about KSA required by employers	BIR19: Information about KSA of current graduates	BIR20: Information about method of deploying technology in education						
Enterprise Business Strategies																
EBS01: Focus on Customer Service				<input type="checkbox"/>	◆	<input type="checkbox"/>	◆			<input type="checkbox"/>						
EBS02: Improve the Quality of Information and Decision Making				<input type="checkbox"/>												
EBS03: Respond to the Needs of a Growing, Diverse Population						<input type="checkbox"/>	<input type="checkbox"/>									
EBS04: Attract, Manage and Retain a Highly Skilled Government Workforce	◆	◆	◆					<input type="checkbox"/>								
EBS05: Balance Freedom of Information with Privacy and Security				◆	◆											
EBS06: Identify and Encourage Improved Service Delivery Mechanisms						◆	◆									
EBS07: Provide a Technically Educated Workforce	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					◆	◆	◆						
EBS08: Promote Continuous Improvement						◆	◆			◆						
EBS09: Improve Procurement of Goods and Services																
EBS10: Ensure IT Interoperability				◆	<input type="checkbox"/>											
EBS11: Optimize Service Delivery Through Improved Stewardship of Limited Resources						◆	<input type="checkbox"/>									
EBS12: Promote Collaborative and Cooperative Systems Development				◆	<input type="checkbox"/>											
EBS13: Foster Economic Development								◆								
EBS14: Reduce Gap Between Availability and Adoption of Technology																
Legend:																
<table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">High Applicability</td> <td style="width: 5%; text-align: center;">◆</td> <td>BIR was directly derived from or is critical to support the EBS</td> </tr> <tr> <td>Some Applicability</td> <td style="text-align: center;">□</td> <td>BIR supports the EBS</td> </tr> </table>											High Applicability	◆	BIR was directly derived from or is critical to support the EBS	Some Applicability	□	BIR supports the EBS
High Applicability	◆	BIR was directly derived from or is critical to support the EBS														
Some Applicability	□	BIR supports the EBS														

EBS/BIR Matrix Continued

	Business Information Requirements										
	BIR21: Information about best practices	BIR22: Information about goods and services required	BIR23: Information about goods and services available	BIR24: Information about existing and pending contracts	BIR25: Information about utilization of contracts and vendor fulfillment	BIR26: Information about technologies and data integration requirements	BIR27: Information about standards for operability	BIR28: Information about core business activities and systems	BIR29: Information about technology needs of employers	BIR30: Information about legal and regulatory restrictions to implementing new technology	BIR31: Information about limits of current environment
Enterprise Business Strategies											
EBS01: Focus on Customer Service								<input type="checkbox"/>			
EBS02: Improve the Quality of Information and Decision Making	◆				◆			◆		<input type="checkbox"/>	
EBS03: Respond to the Needs of a Growing, Diverse Population											
EBS04: Attract, Manage and Retain a Highly Skilled Government Workforce											
EBS05: Balance Freedom of Information with Privacy and Security										<input type="checkbox"/>	
EBS06: Identify and Encourage Improved Service Delivery Mechanisms						<input type="checkbox"/>				◆	
EBS07: Provide a Technically Educated Workforce						<input type="checkbox"/>					<input type="checkbox"/>
EBS08: Promote Continuous Improvement	◆							<input type="checkbox"/>			
EBS09: Improve Procurement of Goods and Services	◆	◆	◆	◆	◆						
EBS10: Ensure IT Interoperability	<input type="checkbox"/>					◆	◆	<input type="checkbox"/>			◆
EBS11: Optimize Service Delivery Through Improved Stewardship of Limited Resources	◆			<input type="checkbox"/>	<input type="checkbox"/>						
EBS12: Promote Collaborative and Cooperative Systems Development	◆					◆	◆	◆			◆
EBS13: Foster Economic Development									◆	<input type="checkbox"/>	
EBS14: Reduce Gap Between Availability and Adoption of Technology										◆	◆
Legend:											
High Applicability	◆	BIR was directly derived from or is critical to support the EBS									
Some Applicability	<input type="checkbox"/>	BIR supports the EBS									

Requirements for Technical Architecture (RTA)

The Requirements for Technical Architecture (RTA) describe the basic attributes of the intended architecture that will be required to support the business strategies and the derived business information requirements. The RTA are directly derived from the business information requirements which are derived from the enterprise business strategies.

- RTA01** The Enterprise Architecture must facilitate provision of information as a primary service of government in the information age.
- RTA02** The Enterprise Architecture must enable deployment of appropriate service delivery directly to customers using cost effective technologies.
- RTA03** The Enterprise Architecture must provide mechanisms to determine and adapt to the service delivery preferences of customers.
- RTA04** The Enterprise Architecture must support implementation of multiple service delivery channels for the same service utilizing common underlying information and systems to enable rapid response to changes in business requirements.
- RTA05** The Enterprise Architecture must provide the capability to locate and present information seamlessly based on the requestor's needs and context without requiring the requestor to know in advance the source or location of the information.
- RTA06** The Enterprise Architecture must support delivery of latest relevant information.
- RTA07** The Enterprise Architecture must enable provision of automated services consistent with customer needs and expectations in a cost effective and appropriate manner.
- RTA08** The Enterprise Architecture must provide mechanisms to collect, continuously update, and use customer service and cost information. This includes:
- quantitative and qualitative information on customer needs
 - the quality, usefulness and access frequency of information or services; and
 - the total cost of implementation and operation of service providing mechanisms.

- RTA09** The Enterprise Architecture must support mechanisms to detect and resolve data discrepancies, incomplete data and incorrect data.
- RTA10** The Enterprise Architecture must support collection and use of customer demographic data to allow customized delivery of services to a broad range of customer groups including those with special needs.
- RTA11** The Enterprise Architecture must support collecting data on service delivery success linked to customer characteristics to facilitate provision of tailored services to different customer segments.
- RTA12** The Enterprise Architecture must provide infrastructure that facilitates collection, analysis and sharing of recruitment data, retention data, and workforce availability information across all levels and branches of government.
- RTA13** The Enterprise Architecture must protect the confidentiality and integrity of data being stored or transmitted.
- RTA14** The Enterprise Architecture must support multiple levels of security, access control and audit capability.
- RTA15** The Enterprise Architecture must facilitate ease of access to information within the constraints of privacy and security.
- RTA16** The Enterprise Architecture must enable flexible sharing of service delivery channels to provide seamless customer service.
- RTA17** The Enterprise Architecture must enable exchange of information about knowledge, skills and abilities (KSA) required for the workforce and about current availability of KSA in the workforce between all levels of government and the business community.
- RTA18** The Enterprise Architecture must facilitate delivery of education services to citizens of all ages across multiple delivery options including non-traditional times and locations wherever citizens need to learn.
- RTA19** The Enterprise Architecture must provide a flexible and scalable infrastructure to support rapid fluctuations in demand.

- RTA20** The Enterprise Architecture must enable capacity, performance and configuration management, using real-time and historical metrics.
- RTA21** The Enterprise Architecture must support rapid deployment and dependable operation of robust and flexible procurement systems to enable expeditious and efficient procurement of goods and services.
- RTA22** The Enterprise Architecture must enable collection, analysis and sharing of procurement performance information to support a well managed and auditable procurement process.
- RTA23** The Enterprise Architecture must support flexible implementation based on industry standards consistent with mainstream trends.
- RTA24** The Enterprise Architecture must support multiple sets of standards to ensure interoperability.
- RTA25** The Enterprise Architecture must facilitate collaborative development of applications and related technology projects by organizations whether or not physically co-located.
- RTA26** The Enterprise Architecture must facilitate distributed project management.
- RTA27** The Enterprise Architecture must enable deployment of common applications in both centralized and decentralized implementations as appropriate.
- RTA28** The Enterprise Architecture must facilitate implementation of a high capacity and high availability technology infrastructure in all parts of the Commonwealth, in cooperation with business and industry that will attract businesses to the Commonwealth and promote widespread economic growth.
- RTA29** The Enterprise Architecture must enable strategic prototyping of new technologies and rapid deployment of technologies and service delivery mechanisms determined to be effective, stable, and appropriate.

Application Portfolio Implications (API)

The Application Portfolio Implications (API) describe, at a high level, the implied affects on the acquisition and management of the applications that support the business functions and strategies.

- API01** Enterprise Architecture is not a mandate to replace or retrofit all existing applications and systems.
- API02** As systems are replaced or retrofitted, adherence to EA guidelines and agreed upon standards will be used as part of the decision process for funding of projects.
- API03** Investment in new applications and retrofit of existing systems will need to be managed using a capital investment strategy that evaluates the total life-cycle cost, including cost of access; and the total value to the citizens of the Commonwealth, not just the initial investment.
- API04** Interoperability with other systems will become an important metric for measuring the quality of existing and proposed systems.
- API05** Ensuring interoperability of existing and new systems will require planning and action on several fronts. Existing systems may need to be modified or replaced, new applications will have interoperability requirements in their design, and purchased systems will be required to be interfaced with existing application portfolios.
- API06** Enterprise Architecture must be based on standards that allow multiple product solutions to be implemented, except in very narrow cases where implementation of a single product or strategy is clearly in the best interests of the Commonwealth.
- API07** Application projects must be managed at a program level to ensure that the best solution is obtained overall, not just for a single need.
- API08** Investment in applications and systems that add value to the Commonwealth will create the need for new funding and cost sharing models to support best "total benefit vs. cost" to the Commonwealth.

Next Steps

The next phase in the Enterprise Architecture development consists of the following four high-level tasks:

1. Develop a Conceptual Architecture (CA)

The Conceptual Architecture (CA) is a principles-based analysis of the interrelated enterprise architecture segments (i.e., business, information, application, and infrastructure). The purpose of the Conceptual Architecture is to translate the business-driven Common Requirements Vision into principle-based components that become the building blocks for designing and engineering technology across business entities, domain architectures, and infrastructure. Thus, the resulting Conceptual Architecture provides pragmatic, operations-oriented guidelines via a logically consistent set of enterprise principles and best practices.

2. Develop Domain Architectures

The Enterprise-Wide Technical Architecture (EWTA) is typically divided into logical groups of related technologies and components, referred to as "domains". The purpose of a Domain Architecture is to provide a combination of domain principles, best practices, reusable methods, products, and configurations that represent "reusable building blocks". Thus, the Domain Architecture provides the technical components within the Enterprise Architecture that enable the business strategies and functions. Note, the Conceptual Architecture (above) serves as the foundation for the Domain Architectures, and ensures that they are aligned and compatible with one another.

To date, the COTS-EA Workgroup has identified and approved the following nine domains for inclusion in the EWTA.

- Network
- Security
- Middleware
- Platform
- Database
- Cost Allocation
- Systems Management
- Information
- Application

It was further agreed that the Network, Security, and Middleware domains would initially be given highest priority, in order to support the Commonwealth E-Government initiatives.

3. Baseline Areas of Proposed Change

The purpose of a "baseline" is to identify the "current state" of an architecture. As part of this step, the Domain Teams will document and model the current environment and technology that make up of their Domain architecture.

4. Perform Gap Analysis

The purpose of gap analysis is to determine to what extent the architecture baseline is not able to meet the requirements identified by the proposed Domain architecture. The Domain Teams will document these "gaps" and their impact. Alternatives to close these gaps will be developed, evaluated, and recommended by the Domain Teams.