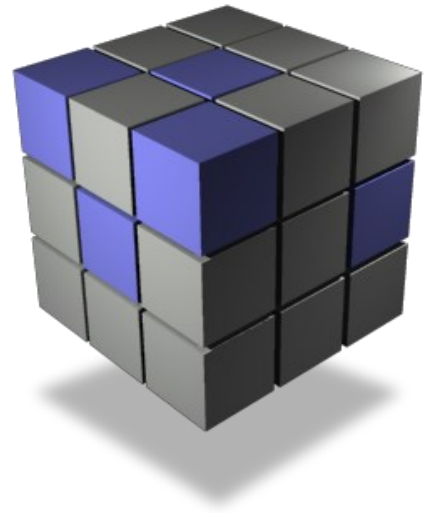


The Role of Architecture and Engineering in Business Operations using the EnterpriseTM.COM Framework with UNICOM System Architect



By EnterpriseTM.COM, a Management Consulting Company specializing in the Architecture and Engineering of Business and Government Operations

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INTRODUCTION

This paper provides an introduction to our book on the role of architecture and engineering in business operations, and to the UNICOM System Architect® based implementation of the EnterpriseTM.COM framework. Entitled “The Heart and Brain of Your Business”, our book presents an architectural approach to documenting and then monitoring your business. Much the same way that the heart and brain are records of who you are and of your health, the architecture of your business operations is the heart and brain of the business as an autonomic¹ system. Certain functions of the body are referred to as autonomic because they are involuntary and performed unconsciously. Like the body breathes without us thinking about it, so should architecture be part of the life of a business, without it being forced and without it being a planned event. As with involuntary functions, there is no need to mention agility and having architecture data on hand makes for an agile business. The architecture and this approach are depicted here in **Figure 1: The Architecture of an organization as the Heart and Brain**. The EnterpriseTM Framework and tools like the UNICOM System Architect® provide industry with a standard for practitioners and individuals who wish to address business challenges and adopt architecture as a form of business planning.

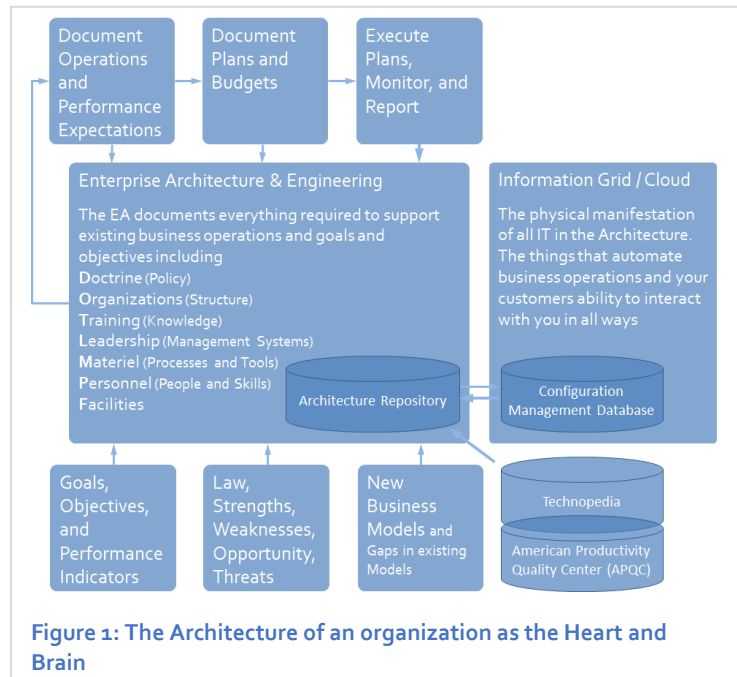


Figure 1: The Architecture of an organization as the Heart and Brain

The use of an architectural approach for documenting business operations and systems goes back to an article written, circa 1987, by John Zachman in the IBM Systems Journal². The topic is also presented in articles published by the U.S. Government’s General Accountability Office (GAO). In both sources there is equal emphasis on the use of an architectural approach to document both business operations and technology. A GAO report published in August of 2010: GAO-10-846g Organizational Transformation Series states that:

“Effective use of well-defined Enterprise Architecture (EA) is a hallmark of successful organizations and a basic tenet of organizational transformation and systems modernization. Since the early 1990’s, GAO has promoted federal department and agency EA adoption as an essential means to achieving a desired end: having operational and technology environments that maximize institutional mission performance and outcomes.”³

The architecture of a business or government / agency is a living part of the organization, one that documents what the organization is intended to be, how it is to operate, and where actual performance measures are established, monitored, and acted upon. By positioning the architecture in this manner and by focusing on the business, performance indicators, revenue / appropriations, and cost, one caters to the business community. One of the first steps in positioning the architecture in this way is to fully embrace the architecture metaphor and to replace discussions about frameworks with discussions about the building blocks of an organization. Building blocks like the Business Lines (Operating Units/Profit Centers), Business Areas (Non-operating Units/Cost Centers), Business Models, Capabilities, and Performance Measures.

¹ The word Autonomic alone means “involuntary or unconscious”. It is used specifically in the medical field relating to the autonomic nervous system. The autonomic nervous system in the body regulates and balances two competing parts of the nervous system.

² Zachman, J.: A Framework for Information Systems Architecture. IBM Systems Journal 26, 276-292

³ Note that the terms “federal” and “agency” in this quote refer to the U.S. Federal Government and U.S. Federal Government Agency’s

These are foundational building blocks of a business. They are documented in the architecture to provide a clear and concise understanding of how the business is structured, what the business does, and how it operates. The architecture of a business then, is the source of knowledge about the constituent parts and Capabilities (another key and foundational building block) of the business. Having a list of well-defined Capabilities in place, the business may then Architect those Capabilities and Engineer the underlying Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities (DOTMLPF)⁴.

Having implemented the Enterprise™.Com framework on the engineering methods built into System Architect® one can now create formal descriptions of their business using our Framework and those formal methods. Our integrated and unified framework rests on and leverages methods and notations that UNICOM System Architect® implements, like the Unified modeling Language (UML) and the Business Proccess Modeling Notation (BPMN). Framework is a fancy word so let's focus now on something simpler: building blocks of a business or government.

BUILDING BLOCKS

In order to (1) Zone an Enterprise⁵, (2) Architect Capabilities, and (3) Engineer DOTMLPF one needs to understand the Building Blocks of a business. The Architecture of a business is fundamentally information about the Building Blocks of the business, including information about how the blocks are interconnected. The building blocks of a house are easy, one has cement blocks of a certain size that can withstand certain pressure, rebar of a particular size, cement that is also designed to withstand a specified pressure. A

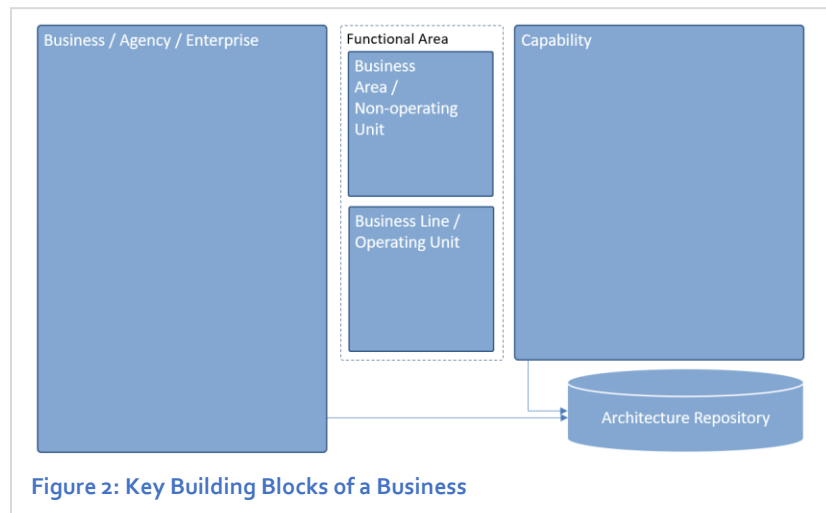


Figure 2: Key Building Blocks of a Business

building has structural timbers and beams of varying sizes and types with the ability to support certain spans / loads. As with traditional building architecture, where the data is about the structure and building blocks of the building, we need the building blocks of a business, and we need information about how those business building blocks are composed and interconnected. You get a glimpse of some large grained and high order building blocks in **Figure 2: Key Building Blocks of a Business**. Starting with the obvious, this figure depicts

Business, Government, and Enterprise as first order objects in our framework and now in System Architect®. When you embark on an architecture effort, you state what legal entity (Business / Government) the Enterprise is and then you state the scope of your effort. The scope might be the entire legal entity or, some portion of it. If the enterprise is the entire Business, that is preferable. If the enterprise is a particular legal entity but your focus is on one organization within the legal entity, so be it and state it. We also show here that a business or government (the Enterprise) is composed of Functional Areas which are either a Business Line (operating unit⁶) or a Business Area (non-operating unit), these are the footings of

⁴ DOTMLPF is Doctrine, Organization, Training, Materiel, Leadership, Training, Personnel, and Facilities from The Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01H, "Joint Capabilities Integration and Development System" (JCIDS)

⁵ We try to avoid using the "E" word (Enterprise), the "A" word (Architecture), and we certainly try to avoid the "F" word because people seem to get flustered with these words, but they are important. Quite simply, an Enterprise is a Legal Entity, a registered business or a government.

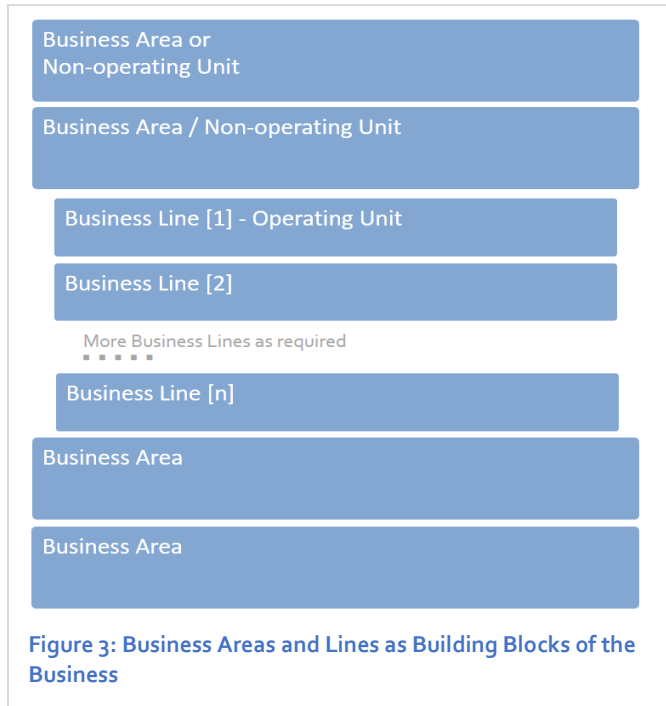
⁶ Operating Unit – is an organizational unit that is designed to deliver services or product to constituents and manage relationships with the suppliers that either provide products or facilitate delivery. A Business Operating Unit is a unit within the company (or agency) that holds assets

the legal entity / Enterprise. Last but not least, we position Capabilities as large grained activities performed by and germane to a Business Area / Line. Business Areas and Lines as building blocks are shown again in **Figure 3: Business Areas and Lines as Building Blocks of the Business** but here we have arranged them as a stack. The intent is to show the business areas as the larger / heavy lifting back office functions that enable the business lines to be lean and focus purely on their mission to generate profit⁷ and/or provide a service. We also depict the business / government in this manner because it lends itself to a supply chain and business model view with suppliers to the right of the business lines and customers / customer segments to the left.

One basic difference between this and traditional building architecture is the need to maintain the data electronically and the daily use of the data⁸. This is where the UNICOM System Architect[®] plays an important role. In the business / government world, the customer has a vested interest in having the entire architecture in a machine-readable form and electronic copies of the blueprints for each Capability. To facilitate this, we store the building block data in industry standard formats in UNICOM's System Architect[®]. To facilitate analysis, we launch analytical (D3js-based) views of your business / government / agency in your favorite browser. UNICOM System Architect[®] plays another very important role here, it provides all the methods required to create an integrated architecture. We store all the data in a single tool and assure that it is integrated.

In their book "The Heart and Brain of Your Business", the authors documented the building blocks of an enterprise and the complete array of building blocks are now available in UNICOM

System Architect[®]. UNICOM System Architect[®] provides the repository where we record your Business Areas / Lines, their Capabilities, and the underlying DOTMLPF. These Capabilities are architected and the inventory or portfolio of Capabilities is now stored in UNICOM System Architect[®] as well. The details about each Capability are gathered in the execution of the Program and Project Management Processes. This is done when a Capability needs to be introduced or when a capital investment needs to be made in an existing Capability. In these cases a Program is formed and the Program executes the Program and Project Management Process along with the embedded architecture activities. The resulting output is a set of blueprints for a Capability. You may view these blueprints as the source of information required for the business case of an investment in any one capability, and as requirements and specifications used for both estimating cost and for construction.



and liabilities and functions as if it were an independent company. They have budgets, plans, a ledger, and account for the assets and liabilities that they hold. Unlike 'non-operating units'; an 'operating unit' engages in business with other parties.

⁷ Please note that many governmental bodies (agencies and authorities) do deal with profits / income. Consider the Port Authority of New York and New Jersey, the Internal Revenue Service, or the United States Postal Service.

⁸ In "Smart Cities", today's building architecture must be digital and online just like Business Architecture; society is beyond the point where paper blueprints can be considered acceptable. A perfect example is, the need for layered building blueprints so that first responders have immediate access to the blueprints for the building that they are rushing off to. Those blueprints need to be layered so that they can also focus on certain information without being burdened by extraneous data.

In **Figure 4: Capabilities and Services**, we provide a graphic depiction of Capabilities, Services, Processes, Activities, etc. which emphasizes the relationships between these building blocks and the difference in granularity. Capabilities are large grained functions⁹ performed by the business or agency in support of its

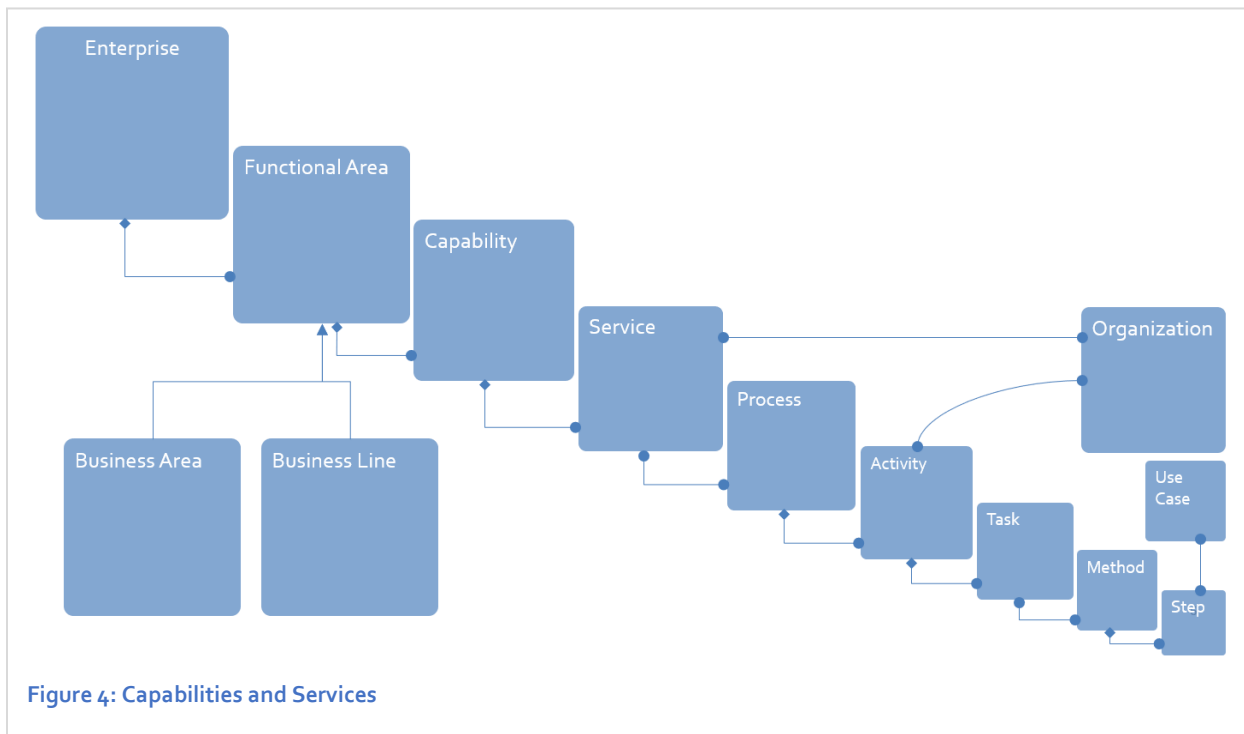


Figure 4: Capabilities and Services

mission. Detail about a Capability starts with the decomposition of the capability into Services. These Services¹⁰ are said to comprise the Capability, and the delivery of those Services is performed by organizational units executing business processes. The business processes are comprised of Activities and the activities are further broken down into Tasks. Tasks are, at times, performed using methods getting one down to the step level. This gives one a feel for the growing level of detail and depth that is in the architecture as one traverse from the Planner View to the Sub-Contractor View in the Zachman Framework®.

Having just introduced the concept of process as it relates to capability and having talked about the need for an architecture ability, we'd like to comment on the notion that there is an "architecture capability" and "architecture process". The authors position architecture and engineering work below the Capability, Service, and Process levels. It is positioned at the activity level and we assert that these activities are performed in the context of other business processes¹¹. For instance, businesses develop investment plans in a cyclic process, referred to mostly as the Strategic Planning Process and certain zoning activities and information are executed and produced in that process.

What the authors have introduced here is a hybrid framework that combines the, Zachman Framework®, the Federal Enterprise Architecture Framework, and the Department of Defense Architecture Frameworks. It is a unified framework and while there are discussions about a Unified Architecture Framework¹² and

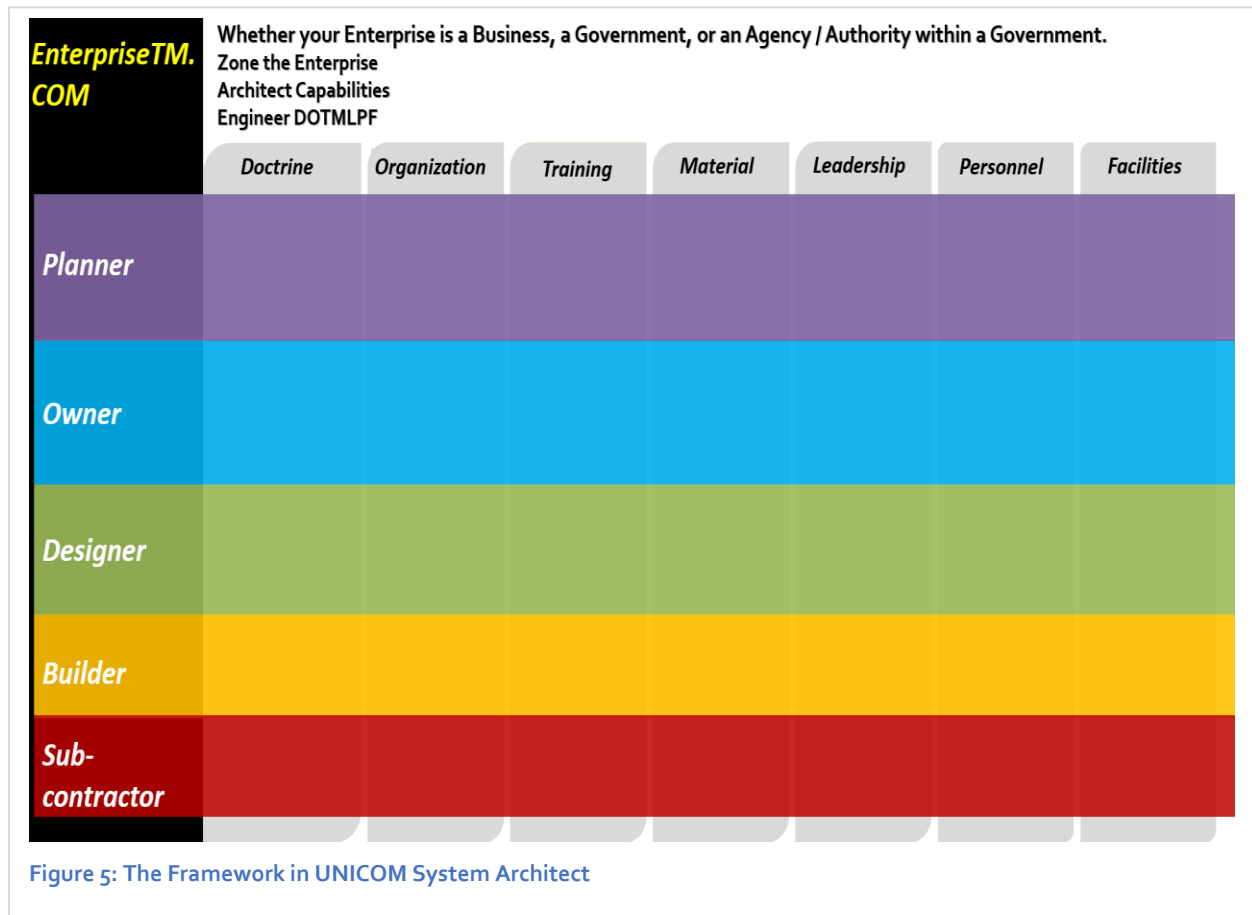
⁹ As depicted in **Figure 4: Capabilities and Services**, the authors differentiate Capabilities from Services, Services from Processes, and Processes from Activities. In our building block approach, we break down Capabilities into Services, the document Services as being delivered through the execution of well-defined Processes, we break down processes into Activities, Activities into Tasks and Tasks are prescribed by a Method that comprises Steps.

¹⁰ These are Business Services rendered by organizations to internal and external clients. They are not to be confused with software provided as a service or web services. We have those forms of services much lower in the architecture stack.

¹¹ In particular, the strategic Planning and Program Management Processes

¹² The development of this Unified Architecture Framework is under way by the Object Management Group® (OMG®) <https://www.omg.org/>

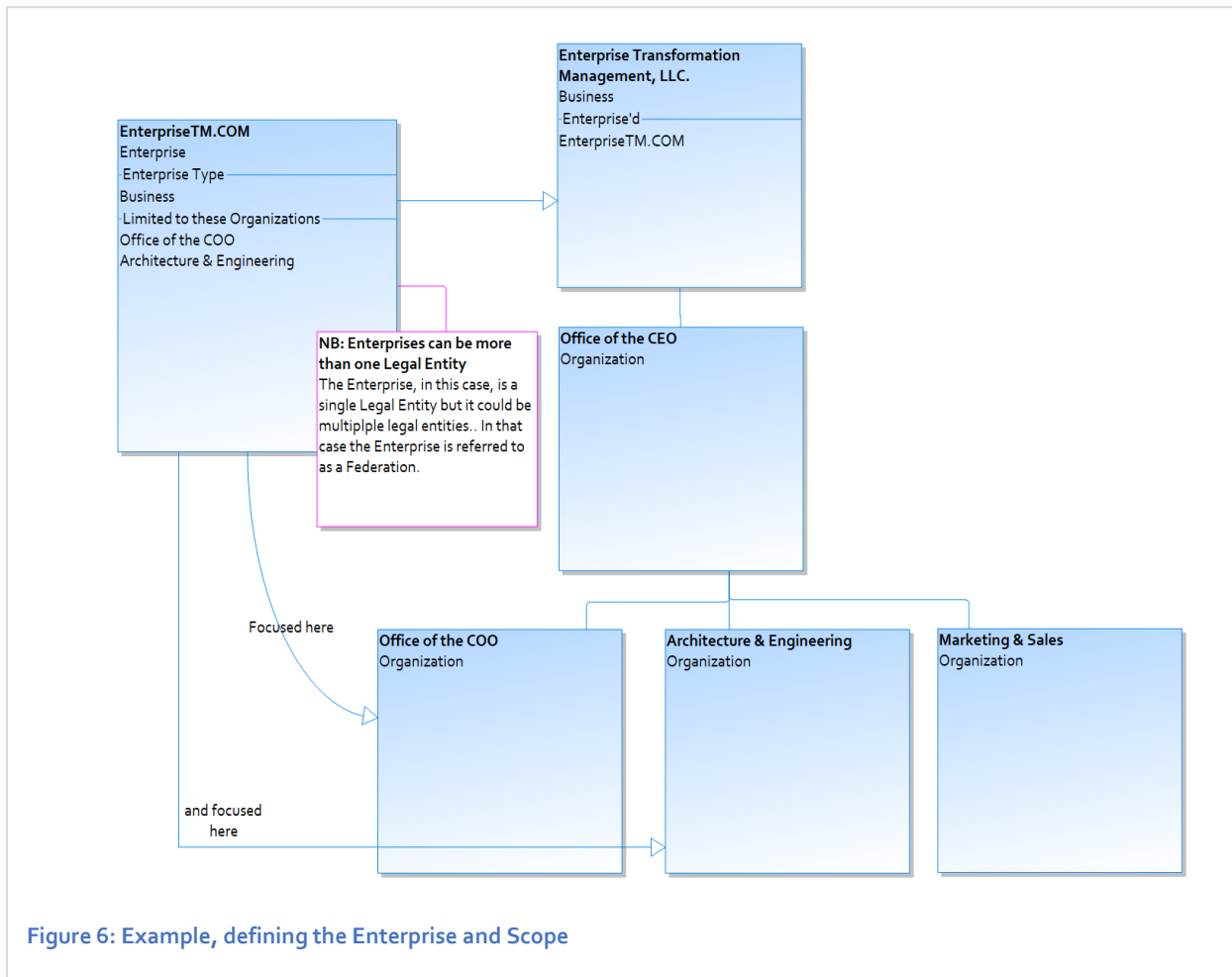
efforts under way the framework and building blocks presented here represent a unified set of building blocks that have been applied at client engagements conducted by the authors.



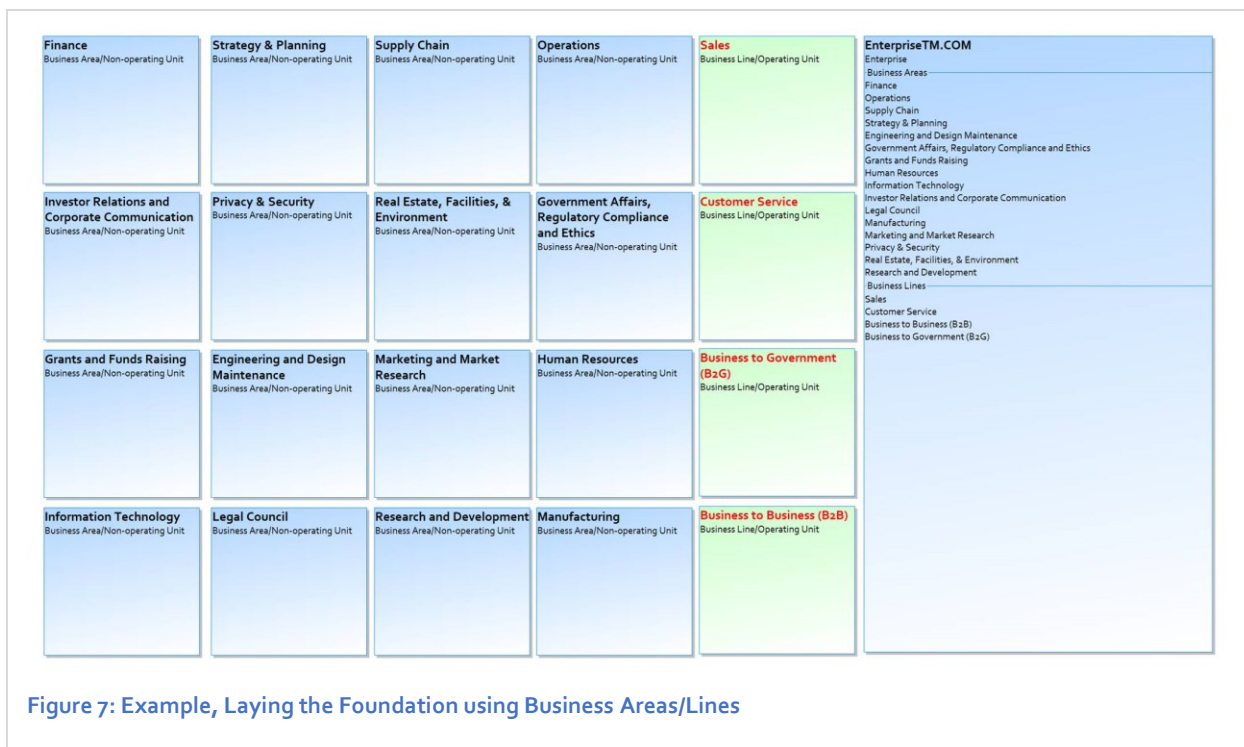
PREVIEW

We started our discussion with building blocks and we've laid the foundation. Stepping back then, let's take a quick look at some of what you will get in UNICOM System Architect® for modeling / documenting your business operations. As depicted in **Figure 5: The Framework in UNICOM System Architect** the rows of the framework are the roles from the Zachman Framework and the columns are the essential ingredients of a mission as defined by the Department of Defense: DOTMLPF. The framework provides two sets of diagrams: one for Zoning the Enterprise and then another set for Architecting a Capability and Engineering the underlying DOTMLPF.

We've listed (below) some of the diagrams which enable you to document the building blocks but an important starting point is a dedicated diagram just for a title page. The title page is the logical starting point when one is creating a presentation, and creating a set of blueprints is no different. Another important diagram right out of the chute is the diagram (see **Figure 6: Example, defining the Enterprise and Scope**) for defining the Enterprise and the scope of your effort. Right here and before you create any detailed diagrams, you define the Enterprise and the Legal Entity. Since it is a first order object / artifact, you may open the settings notebook and start filling it in. If you take this declarative approach then UNICOM's System Architect will take care of the line drawing for you. Every diagram, in UNICOM System Architect® terms is Data-Centric.



The next figure (**Figure 7: Example, Laying the Foundation using Business Areas/Lines**) is an example of this data-centricity and the Business Areas and Lines as foundational building blocks. We created this diagram by drawing lines connecting the *EnterpriseTM.COM* to the Business Areas and Lines that comprise it. The lines were then hidden because they aren't important. What is important is that, in the act of drawing the lines, properties were filled in compliments of System Architect® Data-Centricity. Under the covers System Architect® filled in the settings notebook for you. Conversely, if we started in the settings notebook to fill in the properties manually, System Architect® would have drawn the Lines for us.



Having defined the Enterprise and the Business Areas/Lines that comprise it, you will want to document the Capabilities of each Business Area/Line. Here are some highlights of diagrams created when Zoning the Enterprise:

- Products** being delivered
- Business Models**
- Situational Awareness**
- Education/Training**
- Clouds** being used as types of facilities private, public, and hybrid clouds
- Security Controls**
- Authority to Operate**
- Technologies** and Products that implement them
- Investments** that need to be made
- Roadmaps**
- Schedules**
- Competitors**
- Partnerships**
- Supply Chain** for each Product
- Net-present Value**
- Business Case**
- Staffing Plans**
- Agility and Networks**

Whether you are Zoning a Business or Government, Architecting a Capability, or Engineering the DOTMLPF you now have our integrated / unified framework and UNICOM System Architect® to assist. EnterpriseTM.COM and UNICOM Systems Group in partnership, enable this. You may reach out to EnterpriseTM.COM (**INFO@EnterpriseTM.COM**) for additional information about the framework and to UNICOM Systems Group to inquire about and purchase System Architect. Together our companies will support your efforts to establish the heart and brain of your business.