

Visualizing IT at the Department of Homeland Security with the ArchiMate® Visual Modeling Language

By Iver Band

Overview

Department of Homeland Security (DHS) Chief Information Officer (CIO) Luke McCormack recently submitted testimony to a US Senate Subcommittee [1]. This case study, which is based on CIO McCormack's testimony, demonstrates how enterprise architects using the ArchiMate® language [2] can quickly capture business situations using viewpoints defined in the ArchiMate specification. These viewpoints are templates for views that address particular sets of stakeholder concerns. This case study contains views based on and named after standard templates. For example, the ArchiMate Organization view in Figure 1 is based on the ArchiMate Organization viewpoint [2].

This case study is based almost completely on the content of a single summary document. Its views are not sufficiently detailed for analyzing and building upon a complex organization's strategic capabilities. However, these simplified views should give readers a sense of what is possible with enterprise architecture visual modeling. Interested readers should consult the ArchiMate specification [2] to learn more about the language.

Visual Modeling

In his testimony, CIO McCormack refers to the organizational structure of DHS without fully summarizing it. Figure 1 is an ArchiMate Organization view that shows the key DHS components. It is based on a separately published DHS organization chart [3]. This view uses a single ArchiMate concept, *business actor*, which is defined "as an organizational entity that is capable of performing behavior" [2]. The view shows a set of business actors that compose DHS itself, which is also represented as a business actor. The composition relationship between DHS and its components is represented by *nesting* the DHS components within the symbol for the larger organization.

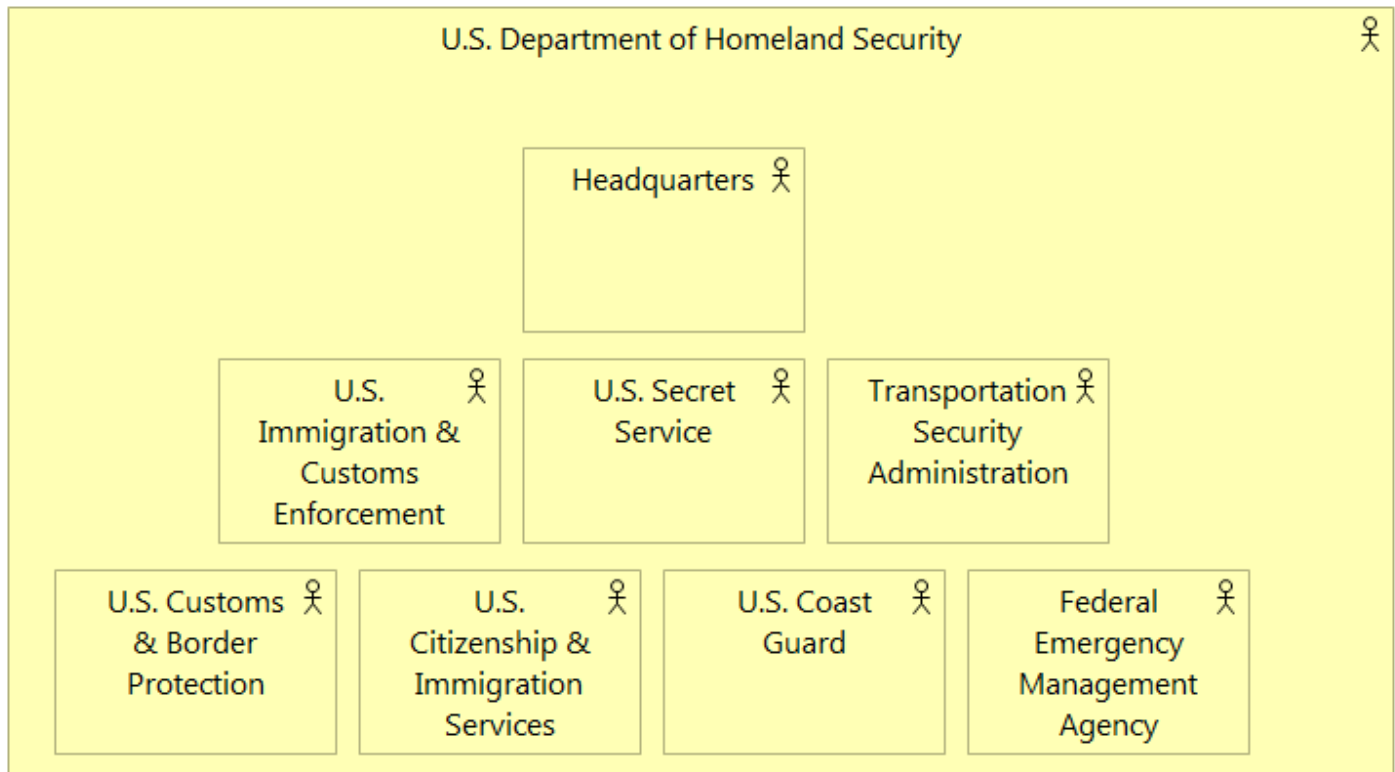


Figure 1. DHS Organization view.

CIO McCormack describes DHS progress in addressing three key concerns: “Infrastructure Governance”, “Strengthening Our Stewardship”, and “Managing Our Workforce”. He prefaces these descriptions with the statement that “DHS has made great strides toward strong management of IT”. The Stakeholder view in Figure 2 models these three concerns as *drivers*, and models the statement about progress as an assessment related to those drivers.

Figures 3, 4 and 5 each give more detail on CIO McCormack’s assessments. Each of these views models the DHS CIO as a *stakeholder*, which is “...the role of an individual, team, or organization that represents their interests in, or concerns relative to, the outcome of the architecture” [2]. Each view also models a particular concern of DHS CIO as an ArchiMate *driver*, which is “...something that creates, motivates, and fuels the change in an organization” [2]. Associated with each driver are a number of ArchiMate *assessments*, each of which are “...the outcome of some analysis of some driver” [2]. Some assessments *aggregate*, or group together non-exclusively, other assessments in these three views. The figures collectively use both nesting and the hollow diamond *aggregation* arrow to indicate this relationship. In Figure 3, the assessment “Clear responsibility for organizational excellence” aggregates the “Robust, tiered governance model”, which in turn aggregates six additional assessments.

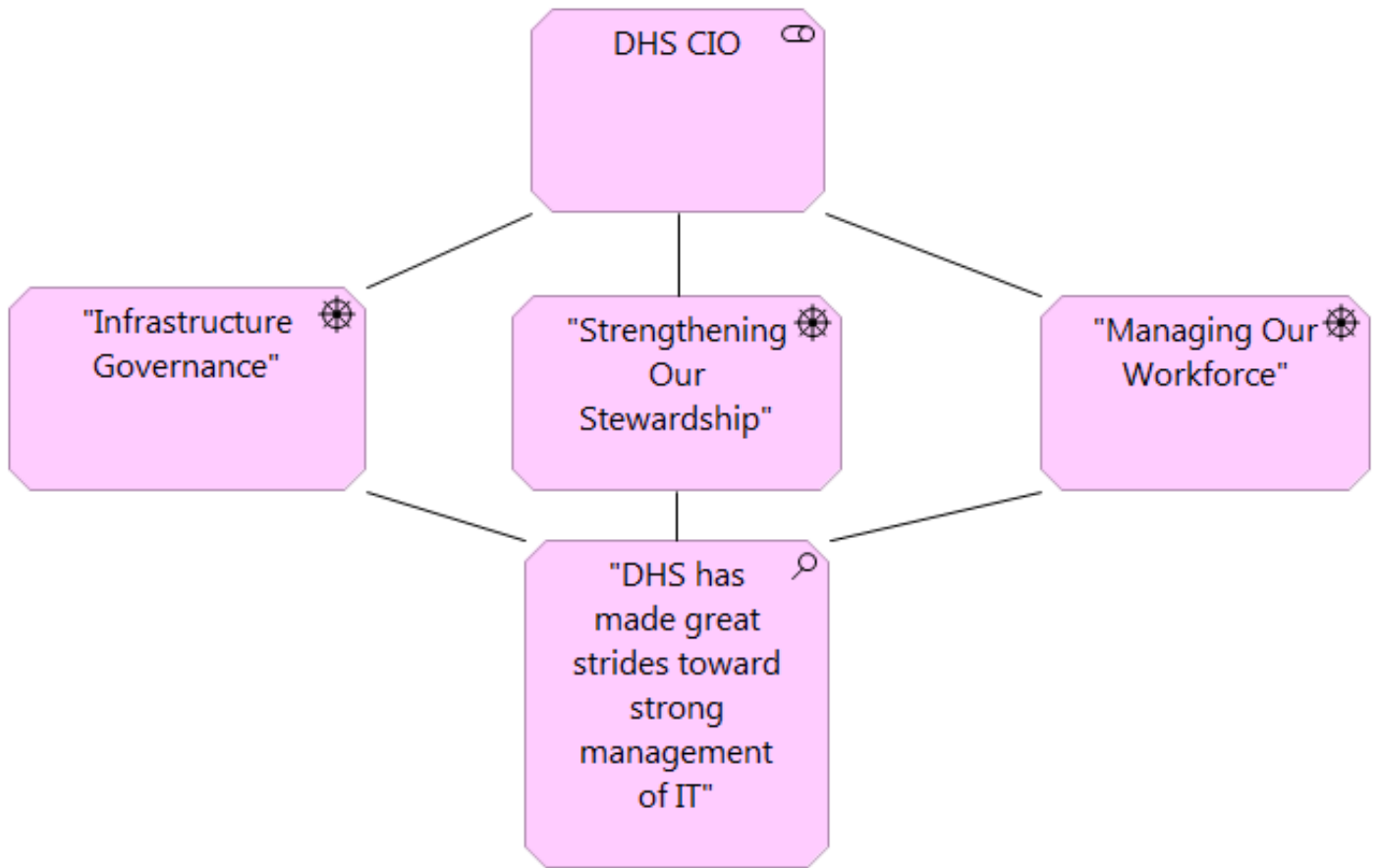


Figure 2. Top-level Stakeholder view of CIO McCormack's concerns.

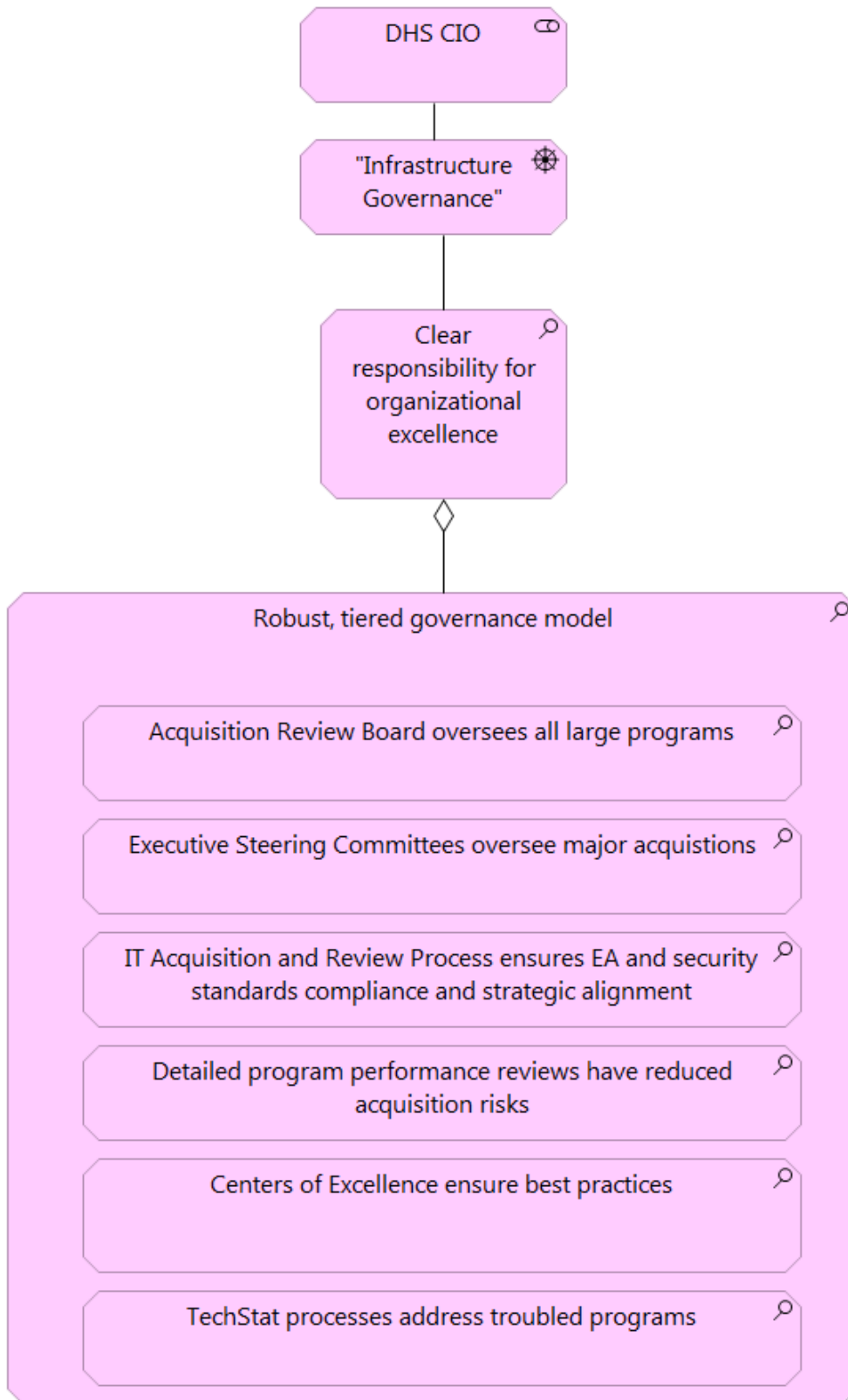


Figure 3. CIO McCormack's assessments related to infrastructure governance

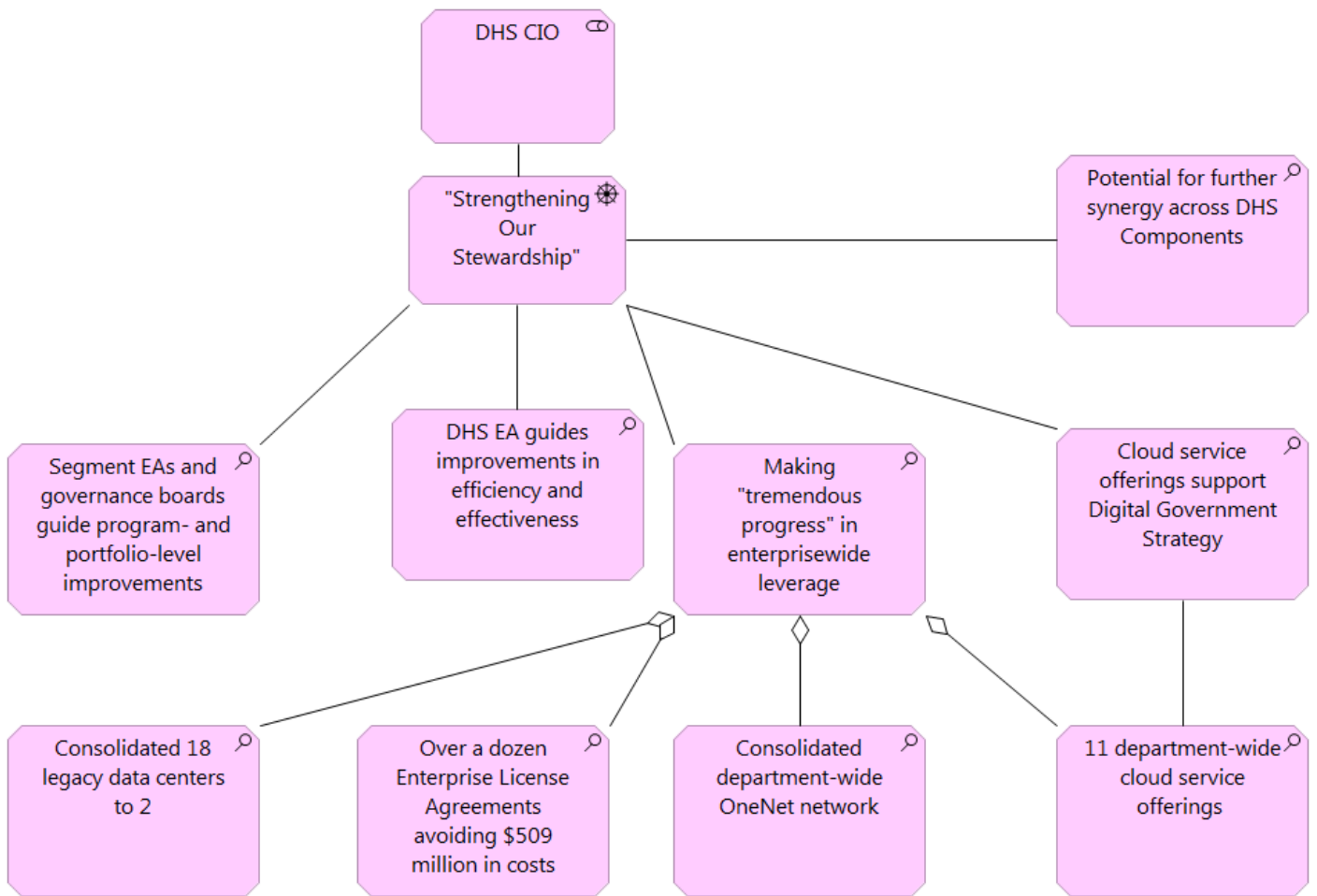


Figure 4. CIO McCormack's assessments related to improving efficiency across DHS

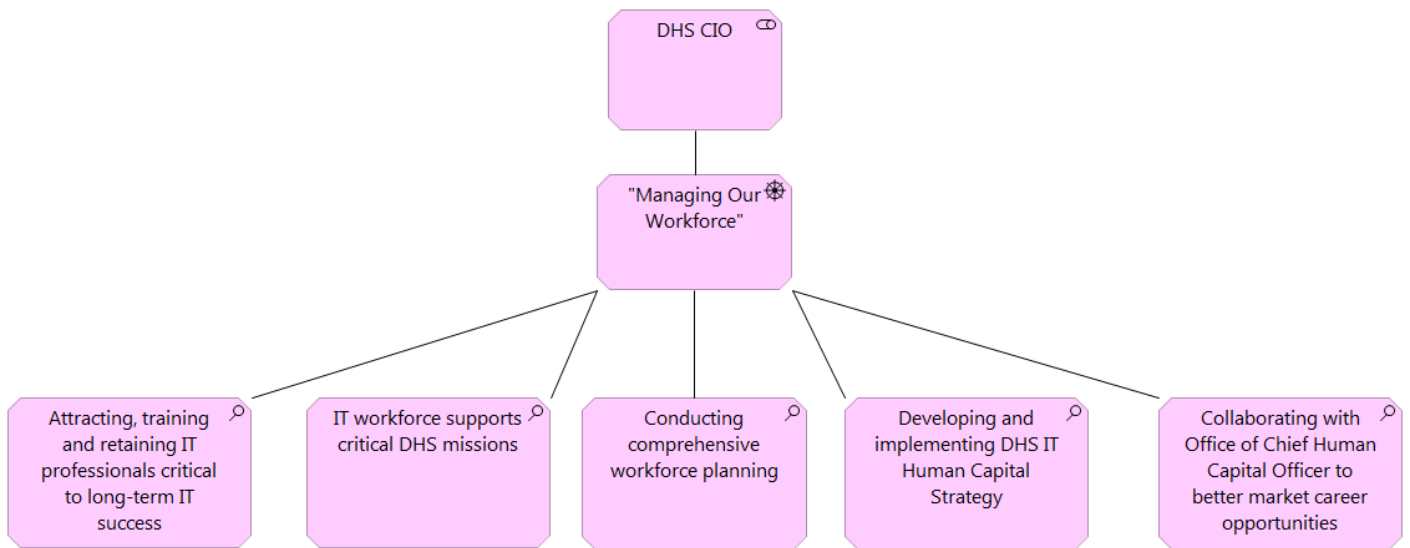


Figure 5. CIO McCormack's assessments related to managing the DHS IT workforce.

The testimony also covers the organizations and activities involved in oversight of DHS IT programs. Figure 6 describes these oversight activities and some of the organizations that conduct them, to the extent that they are mentioned in the testimony. This figure models a series of bidirectional information flow relationships, indicated by the dashed, solid-arrow lines between the DHS IT program business function and a number of other business functions indicated by the chevron icon, and business processes indicated by the horizontal hollow arrow icon. Some of these business behaviors are assigned to business actors, indicated by the stick figure icon, that perform them. The TechStat Accountability session develops, or has a write access relationship to, the Root cause business object, which is read by the Center of Excellence business actor. In other words, the TechStat sessions determine root causes, which serve as input to centers of excellence.

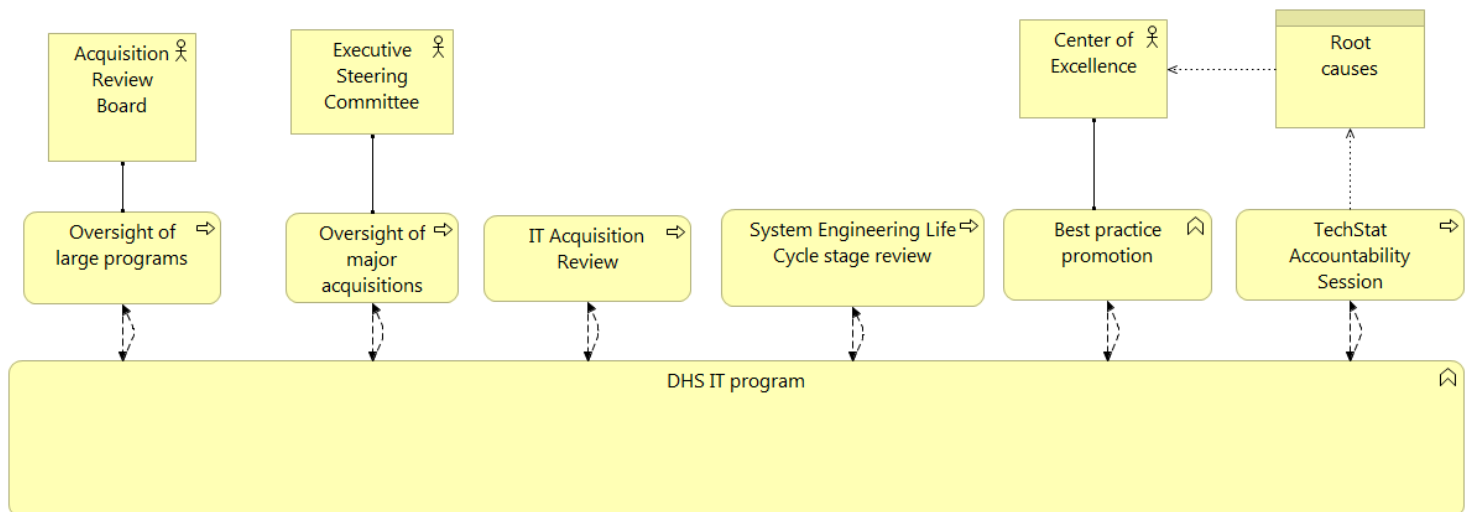


Figure 6. Business Process view of DHS IT program oversight activities.

The testimony also covers the DHS IT data center consolidation activities and the use of the consolidated data centers to deliver department-wide cloud computing services. Figure 7 summarizes this transition based on the limited information given in the testimony, and with the assumption that a phased approach was used to transition from eighteen data centers to two and to establish eleven cloud services. This view uses the ArchiMate *plateau* concept and the *triggering* relationship to depict a progression of “relatively stable” architectural states [2]. The initial and final plateaus each aggregate a number of data center *locations*, which are indicated by the map pin icon. Figure 7 also shows that the eleven cloud *business services* are assigned to the two consolidated data centers. A business service “...fulfills a business need for a customer (internal or external to the organization)” [2].

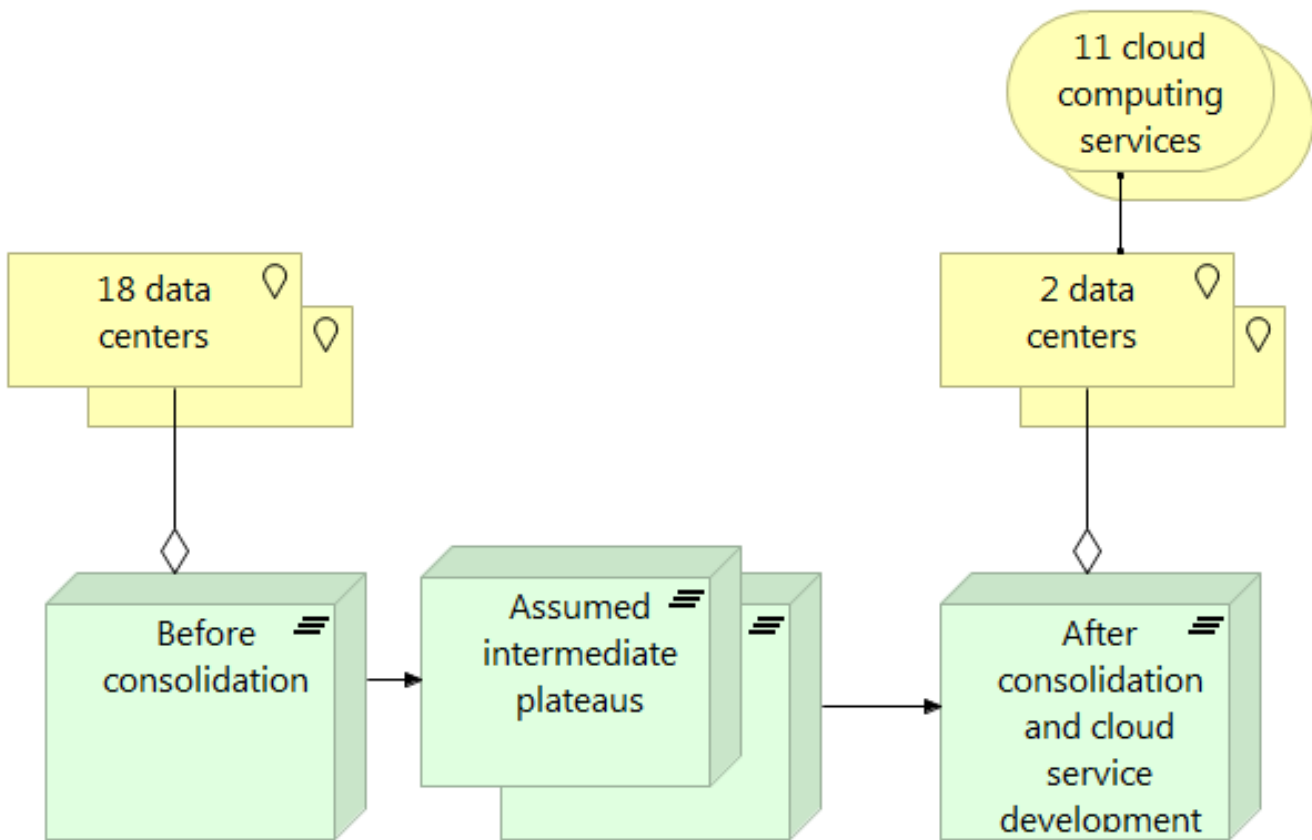


Figure 7. Summary ArchiMate Implementation and Migration view of DHS data center consolidation and cloud service development.

CIO McCormack describes the value of the DHS IT “cloud computing business model”. Figure 8 depicts the model, based on its partial description in the testimony, as an ArchiMate *product*. ArchiMate defines a *Product* as “...a coherent collection of services, accompanied by a contract/set of agreements, which is offered as a whole to (internal or external) customers” [2]. This Product view also depicts the *value* CIO McCormack attributes to this product: capital expenditure reduction, spending transparency, and reduced time-to-market for new capabilities.

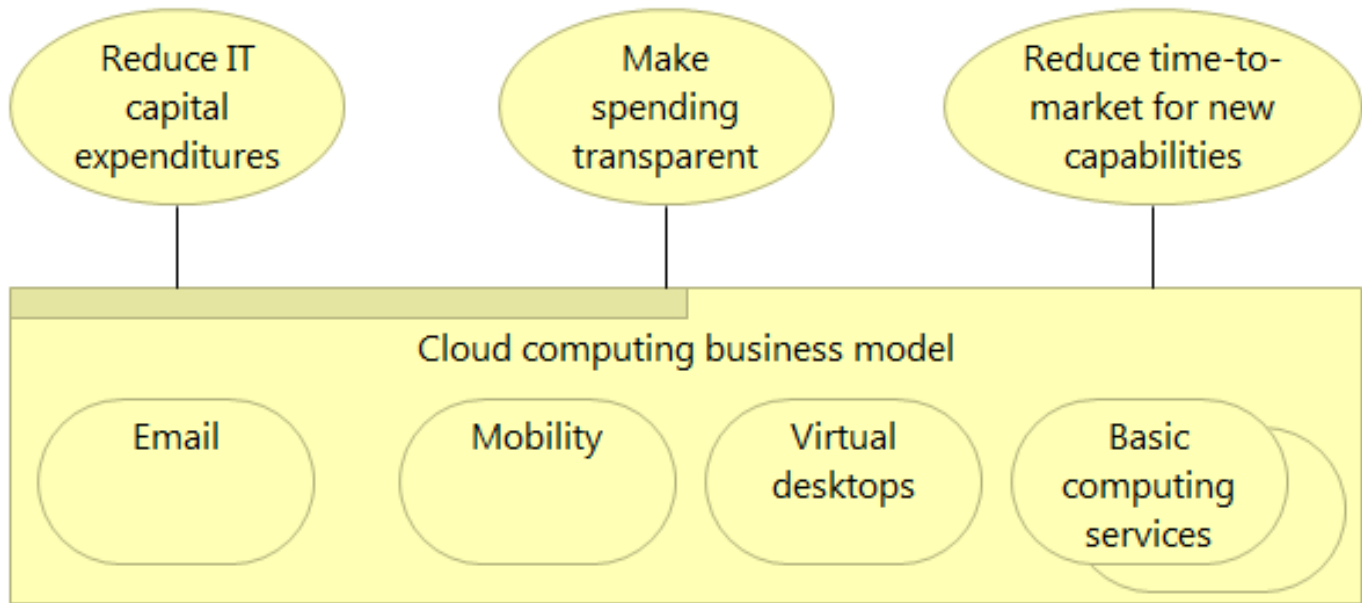


Figure 8. ArchiMate Product view of DHS IT cloud computing business model

Conclusion

This case study gives only a sampling of what is possible using the ArchiMate language. It very selectively demonstrates the ArchiMate Business layer, the ArchiMate Motivation extension and the ArchiMate Implementation and Migration extension. It does not use the ArchiMate Application or Technology layers. However, this case study demonstrates how enterprise architects can use the ArchiMate language to quickly capture any business situation and educate themselves in the process. Then, they can use their initial models to educate others and as the basis for more formal architecture activities.

References

1. Written testimony of MGMT Chief Information Officer Luke McCormack for a Senate Committee on Homeland Security and Governmental Affairs, Subcommittee on Efficiency and Effectiveness of Federal Programs and the Federal Workforce hearing titled "A More Efficient and Effective Government: Examining Federal IT Initiatives and the IT Workforce". Retrieved July 12, 2014 from <http://www.dhs.gov/news/2014/06/10/written-testimony-mgmt-senate-homeland-security-and-governmental-affairs>.
2. The Open Group. ArchiMate 2.1 Specification. Retrieved July 12, 2014 from <http://pubs.opengroup.org/architecture/archimate2-doc/>.
3. Department of Homeland Security Organizational Chart. Retrieved July 12, 2014 from <http://www.dhs.gov/xlibrary/assets/dhs-orgchart.pdf>.

About the Author

Iver Band has a dual career as a practicing enterprise architect and as a developer of EA standards and methods. Late last year, he became an enterprise architect at a major health insurer, where he shapes solutions that enable health care reform. For the previous six years at a diversified financial services company, he focused on business solutions and governance, and prior to that, infrastructure. He guided contact center and CRM implementations, claims system modernization, end user computing and trading workflow automation. As enterprise infrastructure architect, Iver developed data center, computing platform and resilience strategies that continue to shape current investment. Prior to his work in financial services, Iver had a lengthy career at Hewlett-Packard with roles ranging from IT director for a global business to HP Labs visiting technologist. At HP Labs, he researched security topics such as role engineering, and led the development of a patented approach to network security management.

Iver also serves as Director of Enterprise and Solution Architecture for EA Principals, a training and consulting firm, for which he consults with clients, develops curriculum materials, and edits the Enterprise Architecture Professional Journal and EAPJ.org. Iver also represents EA Principals in the Open Group, where he is the elected Vice Chair of The ArchiMate Forum. In that forum, Iver has led development of white papers demonstrating applications of the ArchiMate visual modeling language in financial services and manufacturing. Iver has also written and presented on how the ArchiMate language can be used with the TOGAF Architecture Content Framework for enterprise modeling, with UML for transitioning from enterprise to solution architecture, and with SABSA for enterprise security architecture. Iver has also co-developed the ArchiMate certification exams and made numerous other contributions to the standard.

Iver is TOGAF and ArchiMate Certified, a Certified Information Systems Security Professional (CISSP), a Certified Information Professional (CIP), and a Prosci Certified Change Consultant.