

A VA Executive's Guide to Technology Standards and the Technical Reference Model (TRM)

Office of Technology Strategies (TS), Architecture, Strategy & Design (ASD)



Introduction

To ensure the use of reliable and secure technology at VA, the One-VA Technical Reference Model (TRM) enables VA stakeholders to determine approved and prohibited technologies. This vital information ensures that users comply with the technology standards that govern VA programs, projects, systems, and networks. This TS Note explores the evolution of industry technology standards and the TRM.

A Case Study: Compatibility and the User Experience

Most consumers did not have the opportunity to use a computer until about 35 years ago, when the faster, smaller, and more affordable *microcomputer* first arrived to the marketplace. The original Texas Instruments (TI) TI-99/4 microcomputer, for example, was priced at \$1,150 in 1979 (or \$3,749, adjusted for inflation); yet when the new TI-99/4A priced at under \$50 as part of a “bait and switch” marketing strategy, sales soared. Although the system had the most technologically advanced microprocessor in its market, and double the memory capacity of most competitors, the focus of consumer interest was on productivity and entertainment application *software*. (In fact, the original name of a new upstart at that time, branded its identity with the market demand; “*Micro-soft*” was a linguistic blend of “*microcomputer software*”).

Although the TI product market share was impressive by 1983, TI’s decision to use its own proprietary operating system (OS) software, *rather than the industry standard*, threatened to upend it. Because users could not access software applications

without first using the OS to start the computer, application software needed to be *compatible* with the OS. Since the TI OS was only available to its partner software developers, application software was limited and more expensive for TI-99/4A users. So when the *Pac-Man* game arrived from Japan in 1980 to become a national craze, TI users could not run it. By late 1983, amid [extensive losses](#), TI dropped out of the market, leaving behind 250 million discontinued computers.

Interoperability and Supportability

Software applications produce data that needs to be exchanged between independent business applications. If word processor applications, for example, are not compatible, a user cannot expect the file receivers to be able to open and manipulate them. So when the debut of *Microsoft Office* took *Corel’s Word Perfect* lead in the 1990s, *Office* customers were required to use plug-in components to view *Word Perfect* files. Few organizations, however, informed users of the support requirements. Customers needed to know about the availability of comparable technologies; OS compatibilities; run-time dependency technologies (software required to be downloaded separately to run the application); and the benefits and risks of adopting the software. The One-VA TRM provides this support to its customers today.

Interconnectivity

As early as 1985, developers recognized that a single, standard version of the UNIX OS, an industry standard for minicomputers and networks, was in the best interests of the industry and its customers. Standards were needed to facilitate interconnection to ensure that software would allow global networks and devices to work together. Despite this

The TS office within OI&T’s Architecture, Strategy & Design (ASD) interacts not only with the ASD pillar offices, but also with multiple stakeholders within OI&T and with strategic offices across the enterprise. TS works closely with IT and business owners to capture business rules and provide technical guidance as it relates to Data Sharing across the enterprise, specifically for interagency operability.

acknowledgement, vendors and buyers often failed to agree on standards. These rivalries, known as the “[UNIX Wars](#),” led industry leaders to realize that technical issues frequently took a back seat to intense commercial competition.

Information Assurance and Information Security

With the commercialization of the Internet in 1994, *information security* became a critical issue. Enterprise leaders recognized that standards were needed to avoid using technologies with system vulnerabilities and flaws that could be exploited by attackers. *Information assurance* processes were also needed to assure information protection and manage risks.

Leaders recognized that a technology-neutral industry consortium to oversee technology regulations and standards was essential. And so it was that the *Open Group* was formed in 1996 to develop technology models, standards, and certifications for its members. 1

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TOGAF: The Open Group Architecture Framework

Today, the *Open Group* represents over 400 public and private member organizations, such as Oracle, IBM, SAP, NASA, and the US Department of Defense (DoD). While the Open Group is most notable for its publication of the UNIX OS technical standard, it also develops and manages the TOGAF standard - the enterprise architecture standard used to improve business efficiency by leading organizations worldwide. TOGAF is an approach to the design, planning, implementation, and governance of enterprise information architecture. The architecture represents the fundamental organization of the information systems in the enterprise.

The Enterprise Continuum and Architecture Assets

One of the primary components of TOGAF is the Enterprise Continuum, an on-line repository of all the architecture assets that will be used to develop architectures. Assets can include models and system descriptions from both within the enterprise and from the IT industry.

The VA TRM also includes these assets, such as the support descriptions already mentioned, a vendor information table, a decision matrix, and icons to symbolize standards, such as a flag to indicate a standard that is typically produced by a standards body, such as IEEE (Institute of Electronic and Electrical Engineers).

The TRM and Standards Information Base (SIB)

TOGAF provides two reference models for an Enterprise Continuum: the Technical Reference Model (TRM), a widely accepted core taxonomy or classification system for the technologies that provide the foundation for the architecture; and the Standards Information Base (SIB), a database of open industry standards that define the components. The One-VA TRM contains similar characteristics of the TOGAF reference models.

The One-VA Technical Reference Model (TRM)

Many VA stakeholders first learned about TRM through the TRM Announcement Memorandum of 2010, issued by the Principal

Deputy Assistant Secretary for Information and Technology, who informed VA stakeholders of the requirement that projects and programs must comply with TRM standards. Then the TRM Compliance Enforcement Memo of 2011 reminded VA stakeholders that compliance to TRM standards is mandatory and that failure to comply puts VA at risk.

VA stakeholders may search for technologies using methodologies that are similar to those created by TOGAF models. Users may search a Technology/Standards List, or search among technology categories from a categorization scheme that groups technologies by their properties, and how the intended technology will be used. A stakeholder can determine whether a particular technology was approved, unapproved, planned for divestiture, or prohibited.

The internal VA TRM site, referred to as an *intranet* site, includes enhanced features on the TRM. For example, internal users can request an assessment of a new technology or new version through an online Request Form. Users can also submit inquiries if they have a question. The intranet site also provides links to Initial Product Reviews (IPRs) and Enterprise License Agreements (ELAs).

Conclusion

Standards establish the specifications and procedures designed to ensure the reliability and quality of the technologies used at VA. Standards address a range of issues, including consistent protocols or conventions that can be universally understood and adopted. They form the building blocks for product development and innovation, and speed up time-to-market for industry. When standards allow us to speak the same language, it is easier to understand and compare competing products and assure the requirements for interoperability, interconnection, information protection, and risk management. The Technical Reference Model helps to ensure that VA technologies function as expected and are secure.

If you have any questions about development operations, don't hesitate to [ask TS](#) for assistance or more information.