



MITA Technical Management Strategy

Vermont Agency of Human Services

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1 Revision History

Version	Date	Who	Description of Change
.01	9/18/2018	Kaitlin Epstein, Rebecca Rivard-Darby, David Ladouceur	Document Created.
.02	11/28/2018	Kaitlin Epstein, Rebecca Rivard-Darby, David Ladouceur	Changed document layout and added appendix B and C.
.03	01/07/2019	Kaitlin Epstein, Rebecca Rivard-Darby, David Ladouceur	Made some changes suggested by technical team.
.04	3/14/2019	Kaitlin Epstein, Rebecca Rivard-Darby, Dan Chase	Made some changes suggested by internal reviewers, including IV&V.
.05	9/13/2019	Clark Doney, Kaitlin Epstein, Rebecca Rivard-Darby	Made some changes and additions to provide more clarity along with minor fixes.
.05	10/02/2020	MITA Team	Minor fixes after further internal QA
.05	3/28/2021	MITA Team	Updated Tech language
.05	10/24/2021, 03/02/2022, 09/24/2022	MITA Team	Review for internal QA
.05	11/27/2023 12/20/2023	Sean Judge, MITA Team	Updated Tech language

2 Executive Summary

Best practices for approaching the technological aspects of the State Medicaid Enterprise (SME) currently consist of following the Medicaid Information Technology Architecture (MITA) framework. This framework was developed by the Centers for Medicare and Medicaid Services (CMS). Vermont has adopted the MITA framework to help guide the improvements to the Medicaid system. MITA includes an architecture framework, processes, and planning guidelines for enabling the SME to meet common objectives, while supporting local needs. To adhere to the best practices that are defined in the framework, and to provide the State of Vermont with an overall Medicaid information technology (IT) strategy, this Vermont MITA Technical Management Strategy (TMS) has been created.

The goal of the TMS is to provide a general strategy for IT related improvements within the Medicaid Enterprise. The TMS documents the technologies needed to achieve optimal sharing of SME services and

information and ensure trusted technical models are used. While it does not define a strict list of requirements for any applications, it does provide planning guidelines intended to help make the State Medicaid Agency (SMA) as modular and interoperable as possible.

When decisions about potential upgrades to the Medicaid system are happening, it is important to take into consideration the fact that the principles laid out in this document are high-level, and that there are many other issues that may present as problems while implementing one or more of the principles. Each project performed under the Medicaid umbrella must take the proper precautions to ensure that risk is mitigated.

3 Scope

The TMS is intended to serve as an enterprise- wide document. It applies to all business areas in the SMA. This would include both the Medicaid Management Information System (MMIS) and Integrated Eligibility and Enrollment (IE&E) programs (CMS refers to “Project” – this is synonymous with what Vermont refers to as “Program”).

The intent of the document is to serve as a tool to help guide decisions when systems are being enhanced or implemented. This document is designed to be a high-level view of the preferred technology and infrastructure options available to the SMA. To have a detailed view of what the SMA is currently working on, and evidence of MITA maturity, please see the technical Concept of Operations documents for the MMIS and IE&E programs and the Vermont MITA State Self-Assessment (SS-A).

It should be noted that this document is meant to assist in planning and decision making. While it is ideal to have a system that meets all of these guidelines where possible and feasible, there may be exceptions, and it is preferable to ensure that the best option available is used.

4 Guiding Principles

MITA lists the technical goals as:

- Apply Cloud Computing concepts where possible and feasible.
- Promote an enterprise view that supports enabling technologies aligned with state business processes and technologies.
- Utilize rules engines technologies, where possible, to extend the system configuration abilities to the business community.
- Provide performance standards for accountability and planning.
- Develop systems that can effectively communicate to achieve common program goals through interoperability and common standards.
- Promote an environment that supports flexibility, adaptability, and rapid response to changes in programs and technology.

- Provide data that is timely, accurate, usable, and easily accessible in order to support program analysis and decision-making.
- Reduce duplication of costs by collecting data already available elsewhere and using that data to administer the program more effectively.

MITA lists the technical principles as:

- **Business driven**- MITA uses technology when it supports a business goal or objective; technology should not exist for technology's sake alone. Technical solutions will map to specific business needs.
- **Implementation neutral**- States are responsible for selecting their own technology (e.g., Oracle J2EE, Microsoft.NET) to accomplish alignment with the MITA objectives.
- **Platform independent**- Stakeholders will develop reusable and platform-independent application software.
- **Adaptable, extensible, and scalable**- States will use SOA-based applications so that they can develop them in a modular fashion to accommodate future expanding business requirements.
- **Open technology and standards based** – Stakeholders will leverage the advantages of standardization (e.g., data sharing and interoperability).
- **Integrated Security and privacy** – States will maintain security and privacy of information throughout the MITA Framework.
- **Interoperability standards** – Stakeholders will establish and follow the MITA SOA design principles to ensure seamless functionality between services and other entities.
- **Quality data** – States will design systems to establish the ability to provide the most current data so that they can make business decisions in a timely and accurate manner.
- **Current and proven technology** – Stakeholders will select up-to-date established technology to support current business needs.

MITA lists the technical objectives as:

- Break down artificial boundaries between systems, geography, and funding (within the Title XIX program).
- Adopt data and industry standards and promote the development of appropriate standards when needed.
- Promote the use of data and technical standards to improve the cost effectiveness of IT development. The use of data standards provides better access to data by promoting data consistency and enhanced sharing through common data-access mechanisms.
- Adhere to technical standards, specifically open standards, to facilitate integration of Commercial Off-the-Shelf (COTS) solutions and the reuse of solutions within and among States, resulting in lower development costs and reduced development risk.
- Review national standards for health and data exchange and open standards for technical solutions, using existing national standards whenever possible.
- Promote reusable software and hardware components and modularity.
- Develop reusable services to allow a single service to pass eligibility information from a variety of program systems to a mechanized claims processing, information retrieval, or eligibility determination systems.
- Differentiate between the processes, data, and technical solutions common to the State

Medicaid Enterprise and those unique to individual States.

- Identify common business processes in order to define and reuse common solutions that enable States to share development costs.
- Capture and represent state differences between common business processes that accommodate cost-effective solutions for state-specific needs.
- Encourage state participation in the development of MITA models and templates to ensure that they represent commonality and differences appropriately.
- Enable data sharing without requiring extraction and loading of the data to a central location allowing each organization control and ownership of its own data.
- Use standard definition formats to map data to standard data elements, where appropriate, and provide the data descriptions when the data elements are nonstandard.
- Represent security and privacy access rules for each data element in a standard manner.
- Employ a collection of services to read the data descriptions and security/access rules in order to release information to authorized users for processing.
- Choose to host hubs that identify themselves to others through services and use of standards for the purpose of processing and exchanging data.
- Provide a beneficiary-centric focus of operations.
- Establish access channels, input device transparency, and built-in security and privacy in order to provide beneficiaries with “no wrong door” (i.e., single point) access to Medicaid services.
- Improve data quality by using data standards, applying standard performance standards, and relying on the availability of the enhanced data exchange and sharing provided by the hub architecture.
- Use statistical analysis for comparative and normative analyses in order to provide information to improve service to beneficiaries and the resulting health outcomes by more effectively monitoring patient safety and patient care.
- Enable and support interoperability, integration, and open architectures.
- Employ services that make it possible to deploy common interoperability (i.e., system-to-system communication) and access (i.e., system-to-person communication).
- Package common functionality and capabilities with standard, well-defined interfaces (i.e., services), used by new applications, legacy applications, COTS software, or all three, to invoke the functionality.
- Provide adaptability and extensibility.
- Promote secure data exchange.
- Promote good practices (e.g., the Capability Maturity Model (CMM), data warehouse).
- Use an EA framework and methodology that will allow States to align IT solutions with business needs. The MITA TA helps States to identify and then use common solutions to drive their State Medicaid Enterprise to support alignment with the state EA.
- Use the set of MITA Framework common business processes and data standards to make it possible to develop performance standards, measurement techniques, and corresponding utility services.
- Support integration of clinical and administrative data in order to achieve better health outcomes. This allows stakeholders to redirect dollars formerly spent on preventable diseases or on IT maintenance to more pressing business needs.

To achieve our MITA goals the State of Vermont will rely on our Enterprise Architects and the Standards and Conditions in the planning and decision-making processes.

For the creation of this document, the Vermont Enterprise Architecture team's 'Guiding Principles 2018' was referenced. The principles below encompass state-wide IT guidance and aligns closely with the MITA framework. Vermont's approach to meeting the Standards and Conditions, provided in the MITA Framework, is included in Appendix B.

4.1 Virtualization & Cloud Computing

Services virtualize resource allocation and leverage cloud computing when possible.

Virtualization of resources enables optimal management of services such as utilization, response time, and availability. Additionally, virtualization of resources enables scalability to ensure systems adapt to and meet demand with storage, bandwidth and processing power. This allows the State to better tailor service level objectives and manage cost. By removing the need for physical hardware, the management of the underlying resources is easier and potentially timelier. Resources (such as disk space, memory, CPU's, etc.) can be increased or decreased almost immediately, sometimes automatically, as the business need requires. Virtualized resources appear to the users to be separate computers or servers but in reality, are typically portions of the actual hardware that are partitioned off for a client. Multiple clients co-exist physically on one set of hardware but in such a way as to be "invisible" to the other clients. For this and many other reasons, having virtualization of resources is preferable and a net cost savings to the State. Additionally, uptime of applications running on virtualized servers is also improved because of the ability to easily switch to identical backup systems which can seamlessly take over processing if anything fails in the primary server. Thus, the State pays only for the resources it needs and the users can access the applications running on virtualized servers at almost any time of the day or week.

Aligns with MITA goal: Apply Cloud Computing Concepts where possible and feasible.

4.2 Technological Independence

Software is independent of any specific operating system software or hardware. Application Program Interfaces (APIs) are developed to integrate existing applications with operating environments and applications developed based on the enterprise architecture.

Many applications do not depend on specific technological options and, therefore, can function on different technology platforms. But there are still many applications out there that will run only on certain specific hardware, operating systems and/or platforms. Thus, it's imperative that the IT architecture be planned to reduce the impact of technological changes on the business. This principle requires standards that support portability, which are often called open standards (a principle discussed further down). The independence of technological applications allows them to be developed, adapted, and operated under the best cost-to-benefit ratio. Alternatively, technology (which is subject to supplier dependence and obsolescence) becomes the users' motivation, rather than their requirements.

To obtain more technological independence the State has determined to move toward more cloud-based solutions. Software as a Service (SaaS), Platforms as a Service (PaaS), and other services today are typically provided in cloud-based solutions. By using cloud-based services, the State is freeing itself from

the danger and cost of being tied to any one technology. The providers of the services are required to keep their systems technologically up to date, not the State. Obviously, there will still be times when the State is required to pay for upgrades, but the effort and cost would still typically be much less than if the State was tied to one or more technologies.

Aligns with MITA goal: Promote an environment that supports flexibility, adaptability, and rapid response to changes in programs and technology.

Aligns with MITA principle: Platform independent- Stakeholders will develop reusable and platform-independent application software.

4.3 Convergence with enterprise architecture

The convergence with the enterprise architecture takes place as new applications are built, new technologies are implemented, and older systems are updated or decommissioned.

Convergence offers several advantages:

- It allows the enterprise architecture to evolve and accommodate changes in business and technologies.
- It avoids conversions of obsolete systems, which are extremely expensive.
- Over time, it preserves the investment while promoting the benefits of the enterprise architecture.

As the State moves toward more cloud-based solutions in virtualized environments to acquire technological independence, it is prudent to converge them into a well-architected enterprise infrastructure. The State is in the preliminary stages of planning and architecting such an enterprise infrastructure in a phased approach. The use of one or more Enterprise Service Buses (ESBs) is being considered as part of those deliberations. A well-designed enterprise architecture can be expected to invoke Service-Oriented Architecture (SOA) features and data services to ensure the required interoperability. But of course, the needs of the State's projects and programs, and the user's experience, will play a key role in the ultimate enterprise strategies. Technological decisions will not be made just for technology's sake.

Aligns with MITA goal: Promote an enterprise view that supports enabling technologies aligned with state business processes and technologies.

Aligns with MITA objective: Use an EA framework and methodology that will allow States to align IT solutions with business needs. The MITA TA helps States to identify and then use common solutions to drive their State Medicaid Enterprise to support alignment with the state EA.

4.4 Design for Reusability

Applications are designed for reusability and shared use.

The implementation of applications that are usable across the enterprise is preferred over similar or duplicative applications. Services and platforms designed to allow shared use, or reuse by other agencies or departments within the enterprise allow for more easily integrated and agile systems. Capabilities cannot be developed in a vacuum and new capabilities must be vetted by the Agency of Digital Services (ADS) for potential reuse opportunities.

Reuse of applications is difficult to achieve but possible with good vetting by those people tasked with improving the systems. The problem is that there are many similar functions performed throughout the State's programs, but the "devil is in the details." The details may vary just enough that your "reusable" application becomes more complex than before.

The best way to achieve reusability is by breaking the applications into small components that perform small, simple functions. Sometimes those small components or functions can be combined into larger components that are still reusable. These reusable components can then be made available to other applications to use. Application Program Interfaces (APIs) are good examples of reusable code or components. Of course, the State continues to look to acquire modules that can be used, such as a Data Warehouse, by multiple State programs.

Aligns with MITA goal: Promote an environment that supports flexibility, adaptability, and rapid response to changes in programs and technology.

Aligns with MITA principle: Platform independent- Stakeholders will develop reusable and platform-independent application software.

Aligns with MITA objective: Break down artificial boundaries between systems, geography, and funding

Aligns with MITA objective: Promote reusable software and hardware components and modularity.

4.5 Adhere to Open Standards

Solutions leverage proven, standards-based, technologies to facilitate system interoperability. Open Standards applications promote business and IT agility, reducing risk and achieving a lower overall Total Cost of Operation (TCO).

For example, APIs represent the best adoption of standards (e.g. HL7 messaging, standard vocabularies (e.g. LOINC, SNOMED, etc.). For Vermont's approach to meeting the Industry Standards condition, please see Appendix B: Vermont's Approach to the Conditions and Standards.

To reduce the costs of implementing and maintaining software solutions, and at the same time providing improved solutions to the software users, the State has the goal of implementing Open Standards software whenever possible. This is exemplified by the State emphasizing Commercial Off-The-Shelf (COTS) and Government Off-The-Shelf (GOTS) software products as it upgrades its legacy systems. For example, the State implemented in early 2019 a COTS product called the Provider

Management Module (PMM). Because it is a COTS product, the PMM was able to be configured and deployed into production within just 12 months.

Another great benefit of moving toward Open Standards software solutions is that the State is less likely to be “locked in” to a vendor’s products. This in turn will give the State greater flexibility in its selection of software for its services and will enhance the potential for keeping the software upgraded. With Open Standards software, many software companies and individuals can provide fixes and enhancements (even sometimes for free), thus decreasing the dependency on the State’s established vendors.

Aligns with MITA goal: Provide performance standards for accountability and planning.

Aligns with MITA principle: Open technology and standards based – Stakeholders will leverage the advantages of standardization (e.g., data sharing and interoperability).

Aligns with MITA principle: Current and proven technology – Stakeholders will select up-to-date established technology to support current business needs.

Aligns with MITA objective: Promote the use of data and technical standards to improve the cost effectiveness of IT development. The use of data standards provides better access to data by promoting data consistency and enhanced sharing through common data-access mechanisms.

Aligns with MITA objective: Adhere to technical standards, specifically open standards, to facilitate integration of Commercial Off-the-Shelf (COTS) solutions and the reuse of solutions within and among States, resulting in lower development costs and reduced development risk.

4.6 Interoperability

Software promotes interoperability for data, applications, and technology and provides open standards-based integrations between architecture components.

Standards for interoperability help ensure support from multiple vendors for their products.

One means by which the State plans to improve interoperability (where various applications can communicate with each other seamlessly) is through the use of APIs provided by one or more applications. APIs allow program-to-program data exchange even if the connected applications were developed by different vendors in different industries. APIs use known data parameters and message structures to ensure reliable data exchange and/or sharing. APIs often depend on the use of known, standard vocabularies (i.e. semantic interoperability) such as SNOMED, ICD-10, CPT and LOINC codes to ensure that the shared data is meaningful to the applications doing the communicating.

The State promotes interoperability through the planned use of an Integration Platform. Once implemented, the various State applications would send their messages (with or without data, depending on the type of message) to the Integration Platform. The Integration Platform, in turn, would take one or more actions dependent on the message received. Those actions would most likely include directing that message, and/or its data, to one or more other applications. The applications receiving

the message would then perform the desired function and possibly, though not necessarily, respond back completion of the function through the Integration Platform to the sending application. A major benefit to this implementation of interoperability is that it allows loose coupling between applications (discussed later). The applications don't need to know much about each other; they're not impacted by changes, upgrades, etc. made to the other applications – if, that is, the messages don't change.

Also, the State is investigating options to improve interoperability through the implementation of a Master Person Index (MPI) and the deployment of Master Data Management (MDM) software. With proper data governance efforts (i.e. data cleansing, vetting and validating prior to being loaded) the communication between the various applications will be simpler and more accurate.

For a visual representation of the existing system, modules and user interoperability reference the Vermont MITA Concept of Operations and the MMIS Concept of Operations documents.

The State will continue to build upon Federal standards including The Center for Disease Control (CDC), National Institute of Standards and Technology (NIST), Office of the National Coordinator for Health Information Technology (ONC), Health Information Technology (HIT), and Nationwide Health Information Network (NHIN) with emerging national interoperability standards for content exchange, vocabulary/notation and privacy/security.

For Vermont's approach to meeting the Industry Standards condition, please see Appendix B: Vermont's Approach to the Conditions and Standards.

Aligns with MITA goal: Develop systems that can effectively communicate to achieve common program goals through interoperability and common standards.

Aligns with MITA principle: Open technology and standards based – Stakeholders will leverage the advantages of standardization (e.g., data sharing and interoperability).

Aligns with MITA principle: Interoperability standards – Stakeholders will establish and follow the MITA SOA design principles to ensure seamless functionality between services and other entities.

Aligns with MITA objective: Promote the use of data and technical standards to improve the cost effectiveness of IT development. The use of data standards provides better access to data by promoting data consistency and enhanced sharing through common data-access mechanisms.

4.7 Standard Data Exchange Formats

Standardized and accessible formats are used to exchange data between systems, users, and vendors.

Whenever possible, use standardized and accessible formats, such as the National Information Exchange Model (NIEM), to exchange data between systems, users, and vendors.

Achieving this principle requires the infrastructure to support open industry data exchange standards for consumption internally and externally. Stakeholders must understand and have a strategic alignment to industry standards.

In healthcare, a major benefit of using standard data exchange formats is that the data can be shared between clinicians, labs, hospitals, pharmacies and patients regardless of the applications or their vendors. XML, JSON, HL7 and SQL standards are common standard formats (among others) that the State uses to exchange data between applications. The State still uses some legacy data formats to send or receive data such as text files containing text data elements, each separated by a delimiter such as the pipe character ('|'). However, these are not standard formats (they're all unique) and thus are candidates for replacement as the State continues its move to standard data exchange formats.

The State is also investigating the use of the Fast Healthcare Interoperability Resources (FHIR) data exchange standard. It is an emerging standard describing data formats and elements known as resources and an Application Programming Interface (API) for exchanging electronic health records or elements thereof. According to hl7.org, FHIR aims to simplify implementation without sacrificing information integrity. It leverages existing logical and theoretical models to provide a consistent, easy to implement, and rigorous mechanism for exchanging data between healthcare applications. Because HL7 FHIR combines the best features of HL7 V2, HL7 V3, and CDA while leveraging the latest web service technologies, it is of interest to the State and warrants investigation. One possible future use is for State data exchanges with the Vermont Health Information Exchange (VHIE) because FHIR can send/receive only those data elements desired rather than entire bundles or packages of data (such as Continuity of Care Documents (CCDs), for example). The VHIE utilizes FHIR today.

Aligns with MITA goal: Reduce duplication of costs by collecting data already available elsewhere and using that data to administer the program more effectively.

Aligns with MITA principle: Open technology and standards based – Stakeholders will leverage the advantages of standardization (e.g., data sharing and interoperability).

Aligns with MITA objective: Adopt data and industry standards and promote the development of appropriate standards when needed.

Aligns with MITA objective: Promote the use of data and technical standards to improve the cost effectiveness of IT development. The use of data standards provides better access to data by promoting data consistency and enhanced sharing through common data-access mechanisms.

4.8 Loosely Coupled Interfaces

Interfaces are loosely coupled, are self-described, and offer low cost impact in case of changes. Loose coupling is an architectural principle and design goal in SOA.

Loosely coupled interfaces are preferable because when interfaces between independent applications are tightly coupled, they are less generic and more susceptible to causing unwanted, secondary effects when they are changed.

The degree to which a service is independent of, or unaware of, the service consumer is the degree to which they are “coupled”. Thus, loose coupling means that the services (corporate APIs, for example) are conceived and created with little or no affinity to certain service consumers. Therefore, loose coupling

(versus tight coupling) exists when a service is largely, or even completely, unconnected to one or more service consumers. Obviously, for improved, less-costly maintenance reasons alone, a loosely coupled architecture, whenever possible, is preferable to a tightly coupled architecture. For this reason, the State is driving towards loosely coupled solutions and architectures.

Aligns with MITA goal: Promote an environment that supports flexibility, adaptability, and rapid response to changes in programs and technology.

4.9 Application Interface design must adhere to REST-style and WS-I style Architectural Principles

Application interfaces are designed to be open and accessible using web standard frameworks.

REST-style uses web standards such as HTTP, URL, XML, HTML and JPEG. WS-I style standards use SOAP, WSDL, and UDDI for program-to-program communications.

REST-style Web services are attractive because the approach follows the Web architecture for formats, interfaces and protocols.

The State continues to require and implement these principles as it has incorporated web-based modules (such as PMM and Care Management) into its systems.

Aligns with MITA goal: Develop systems that can effectively communicate to achieve common program goals through interoperability and common standards.

Aligns with MITA objective: Adopt data and industry standards and promote the development of appropriate standards when needed.

4.10 Ensure Architectural Non-Functional Requirements (NFRs)

Performance requirements, and other non-functional requirements, are defined or selected prior to design specifically to support the business' functional requirements (FRs).

The State and Vendors are required to define and adhere to NFRs. The State has a list of NFRs that are considered when implementing new modules, entering into contract negotiations or performing other Software Development Life Cycle (SDLC) activities. These NFRs fall into one or more of the following categories: Compatibility, Maintainability, Performance Efficiency, Portability, Reliability, Security and Usability.

For each new module, since the superset of NFRs is so large, only the NFRs that apply to or support the module being implemented, the user base, the technical environment, and the data being collected, displayed or referenced are chosen. At the appropriate time an Enterprise Architect, Technical Lead, ADS manager or other assigned resource considers each of these NFRs for inclusion in an RFP, Contract or Amendment as appropriate. These NFRs may be used in assisting the State in determining Service Level Agreement (SLA) compliance by the vendor implementing the module as well as the vendor providing Maintenance and Operation (M&O) for the module, which may or may not be the same vendor. As the State needs and technology change and evolve these NFRs are continually reviewed for applicability and revised as needed. The ultimate goals of these NFRs are to: (1) determine the reliability, scalability, and availability of the solution; (2) ensure the solution performs as desired and required.

Aligns with MITA goal: The use of these State NFRs will promote environments that supports MITA and State standards for each of the seven categories listed above while enabling Vermont and its vendors to meet changes in programs and technology advancements.

Aligns with MITA principle: Business driven- MITA uses technology when it supports a business goal or objective; technology should not exist for technology's sake alone. Technical solutions are selected to map to specific, prioritized business needs.

Aligns with MITA objective: The use of these State and vendor NFRs will enable improved data quality by using data standards, applying standard performance measurements, and relying on the availability of an enhanced data exchange and sharing provided by the hub architecture.

4.11 Data Quality and Value

Data is of great value. Technology implementations and system design support data quality. Data quality is defined as complete, accurate, timely and accessible.

Data quality issues are the most limiting factor to leveraging information assets. Appropriate research and planning are required to understand potential data issues. System information must always be correct and considered up to date with any margin of error as defined by the Service Level Agreements (SLAs).

It is a challenge to determine the quality aspects of data without conducting a comprehensive analysis of the data values, as well as their sources and intent. This is typically done through data profiling to develop general characteristics of the data as well as gaps, deformities, inconsistencies and lack of standard vocabularies, terminologies and standard values.

For example, because there are a large variety of sources sending data to the Vermont Health Information Exchange (VHIE), the VHIE incorporates various filters and terminology services to transform the original data values and structures to more consistent, standardized equivalents. Data residing in a data warehouse, such as the VHIE, must reflect known fields and values expected by a wide

variety of users. The State sees the value of a Medicaid Data Warehouse (MDW), separate and distinct from the VHIE, and has begun a project to implement a Medicaid Data Warehouse and Analytic Solution (MDWAS).

Resources will be prioritized towards protecting the quality, availability, accessibility, and security of the State's data according to the business' values and government regulations. Technology must support the decision maker's ability to access the data, plus understand its timing, reconciliation, completeness, and accuracy.

This will be done through applications and shared services that minimize the labor intensity to enter, access, and manipulate data. For more information on data governance and data stewardship, please see the MITA Data Management Strategy also known as the AHS Data Governance Manual.

Aligns with MITA goal: Provide data that is timely, accurate, usable, and easily accessible in order to support program analysis and decision-making.

Aligns with MITA principle: Quality data – States will design systems to establish the ability to provide the most current data so that they can make business decisions in a timely and accurate manner.

4.12 Configuration over Customization

The preferred application allows for simple configuration rather than requiring complex customization to achieve business goals.

Customization is more invasive to the core application than configuration because it requires programmers to modify the program or write a new program to do something that the software wasn't originally designed to do. Though it may be required for the business to meet the specified contractual requirements, customization means more effort and more risk because custom code has a greater tendency to break in an upgrade.

Configuration, on the other hand, means less effort and less risk than customization because functions within the application are used to make only allowed changes expressly designed into the application. Thus, if the business allows, configuration is inherently better than customization because it is working within the application. Configuration often is accomplished by using administrative user interfaces to set parameter values or link to new or different tables of values.

The use of rules-based software or rules engines within applications or modules is another excellent way to "configure" the system and reduce customization.

Customization increases system complexity, generally reduces reusability, and increases the difficulty of future upgrades and integrations.

Rules engines enforce business rules and isolate these from algorithms and constraints that would otherwise be hard coded into the application code, thus making changes risky, complex, and expensive. For the reasons stated above, it's important to the State that current and future modules have strong configuration capabilities and/or rules-based software.

Aligns with MITA goal: Utilize rules engines technologies, where possible, to extend the system configuration abilities to the business community.

4.13 Master Data Management

All business data has an authoritative source.

Multiple sources of the same data have the potential to cause data quality/integrity issues, greatly increasing system complexity, overall cost, and reducing agility. There must be one designated source of truth to control data quality for each data element and technology implementations and system design must support this.

Data management and governance is a maturing process for Vermont. For further information on plans and adoption of data polices and governance, please refer to the MITA Data Management Strategy listed in Appendix C: References or Section 5: Oversight.

Aligns with MITA goal: Reduce duplication of costs by collecting data already available elsewhere and using that data to administer the program more effectively.

Aligns with MITA principle: Quality data – States will design systems to establish the ability to provide the most current data so that they can make business decisions in a timely and accurate manner.

Aligns with MITA objective: Promote the use of data and technical standards to improve the cost effectiveness of IT development. The use of data standards provides better access to data by promoting data consistency and enhanced sharing through common data-access mechanisms.

4.14 Security

All data is accessible by only the individuals who require the information as part of their business process.

The State feels strongly about ensuring that all data is accessible by only the individuals who require the information as part of their business process. Technology implementations and system design must support this.

The enterprise must comply with regulations for transporting, persisting, and maintaining data whenever it is applicable, such as healthcare records or personally identifiable information (PII).

The database must be able to control access to information based on user and data security classifications and protect sensitive data from all users, including privileged database users. Confidential data must be in encrypted form, both within the database and on backup media.

Aligns with MITA principle: Integrated Security and privacy – States will maintain security and privacy of information throughout the MITA Framework.

4.15 Service-Oriented Architecture (SOA)

Technical systems and applications are designed with a Service Oriented Architecture (SOA) approach, which supports modularity and reuse.

SOA is a software design strategy that packages common functionality and capabilities with standard, well-defined interfaces. By connecting information and functionality, as well as promoting collaboration in a SOA environment, Vermont will yield better and more cost-effective outcomes for its citizens, the State, and Federal Partners. The State is in the later stages of an extensive effort to align CMS Certification Criteria to State standard Business Functions, Functional Requirements and Non- Functional Requirements. When complete the State will have a predefined list of how each of these standard requirements align across the board for every project. The idea is for this spreadsheet to act as the base certification requirement and to streamline the RFP, Contract, Requirements and Certification preparation processes. Additional module requirements will be added as needed to provide a complete list of Certification Criteria to all types of State Requirements in a single location.

Specific data dependencies and module interoperability is investigated on a module by module basis and discovered during the analysis phase of a project. The State ADS team consists of several professional Business Analysts (BA) that review each module, the data needed by the particular module as well as the user community and creates business requirements identifying the need, permissions to the data and the system of truth for the data. These requirements are then incorporated in an RFP or Business Requirements Document (BRD) and eventually flow downstream to be incorporated into the State User Acceptance Test (UAT) Plan and then as evidence for certification, if the module is being certified.

Aligns with MITA goal: Develop systems that can effectively communicate to achieve common program goals through interoperability and common standards. Long-term goals of the State's SOA implementations are to allow for advanced Master Data Management (MDM), Master Person Index (MPI) and module interoperability to provide the State business and technical resources as well as the State's citizens better service, eligibility and enrollment determinations and reduced data duplication across the MMIS environment, and beyond into other areas of the State, to truly allow interoperability and integration at a State level.

Aligns with MITA principle: Adaptable, extensible, and scalable – States will use SOA-based applications so that they can develop them in a modular fashion to accommodate future expanding business requirements.

Aligns with MITA principle: Interoperability standards – Stakeholders will establish and follow the MITA SOA design principles to ensure seamless functionality between services and other entities.

5 Oversight

Vermont's process for ensuring support of these principles and strategies, to the extent possible as it builds out its enterprise, are provided below.

- **Governance:**
 - The MMIS, IE&E, and Health Information Exchange (HIE) programs are governed by Steering Committees, which are empowered to make decisions regarding projects and initiatives in those respective programs. Voting and non-voting members of the Steering Committees include representation from the Vermont Agency of Digital Services (ADS), ADS Enterprise Architecture, legal, finance, and program leadership. As necessary, recommendations get brought up to the AHS Executive Committee for final decisions.
 - The purpose of the Agency of Human Services (AHS) Data Governance Council is to make decisions and provide guidance to ensure the effective implementation of AHS Data Governance in all AHS departments and realize the AHS Data governance mission and vision. The mission of AHS Data Governance is to foster a culture and embed a framework of accountability and responsibility for governing AHS data. The vision of AHS Data Governance is that AHS culture supports the efficient use, sharing, and linking of quality data across AHS programs for effective decision-making at all organizational levels to improve outcomes, client experience, service delivery, and investment allocation across the service system.
 - Exploration of a new IT project or module requires defining and justifying the business need, proposed solution, and estimated solution costs. The Business Lead (or Project Manager if already assigned) works with the Enterprise Project Management Office (EPMO) to obtain the State Chief Information Officer's (CIO) approval on the Business Case/Cost Analysis or IT Activity Business Case & Cost Analysis ([IT ABC Form](#)). This is another check to ensure systems meet the technical principles. For instance, under leveraging the success of others, it asks if there are Other State, Federal or Municipal government entities using the proposed solution to meet a similar business need.
 - CMS approval of APDs, contract Amendments, Certification decisions.
 - The Department of Vermont Health Access (DVHA) is responsible for the management of Vermont's publicly funded health insurance programs. There is a documented Change Control Plan (CCP) describing the process for change control for all DVHA Portfolio Information Technology (IT) projects for 1) Design, Development and Implementation (DDI), 2) Maintenance and Operations (M&O), and 3) all projects within Programs with Steering Committees including those that may not be IT projects. The CCP creates a Portfolio Change Control Board (CCB) to oversee material changes across the projects to ensure Portfolio Level oversight of the work.
<http://dvha.vermont.gov/administration/dvha-portfolio-change-control-plan>
- **Contract and Vendor Management:**
 - The State is continuing to mature its processes for contract and vendor management along with establishing Key Performance Indicators (KPIs) and Service-Level Agreements (SLAs).

- **Enterprise Architecture (EA):**
 - These principles largely came from the EA group. The EPMO engages ADS Enterprise Architects during the Request for Proposal (RFP) and contract review process. Architecture Exceptions can occur at all points of a service or applications lifecycle, they are deviations from the State Architecture Guiding Principles. When they occur, the Enterprise Architect acts in an oversight capacity; they review exceptions, weighing the risks and costs, against the potential benefits of granting the exception.
 - Enterprise Architects maintain the list of State non-functional requirements (NFRs) aka technical requirements which can be used in contracts. Non-functional requirements provide qualities and constraints for an IT solution, allowing its performance to be assessed for acceptance and its alignment to SLAs.
 - Enterprise Architects work with Business Architects to align their IT efforts with both customer goals and with the larger goals of the State.
 - Vermont Enterprise Architecture Framework for IT Projects: State of Vermont Enterprise Architecture Framework (VEAF) is based on The Open Group Architecture Framework (TOGAF) and Oracle Enterprise Architecture Framework (OEOF). It provides a standardized, but adaptable, approach for State Enterprise Architects to guide the integration of IT projects into the State Architecture. Enterprise Architects within the State of Vermont use the VEAF to provide a standard approach for enterprise level growth of the IT infrastructure within the State of Vermont.

- **Documentation:**
 - Vermont is in the process of updating the Standards and Conditions sections of its State Self-Assessment (SS-A) and has completed the Information and Technical Architecture sections. It will revisit the *as-is* and *to-be* maturity levels for the Enterprise with technical leadership and subject matter experts on a regular basis.
 - The AHS Data Governance Manual is serving as the MITA Data Management Strategy.

6 Appendix A: Glossary of Terms

Term	Definition
ABC	Activity Business Case & Cost Analysis
ACA	Affordable Care Act
ADS	Agency of Digital Services
AHS	Agency of Human Services
API	Application Program Interface
CCB	Change Control Board
CCDs	Continuity of Care Documents
CCP	Change Control Plan
CDC	Center for Disease Control
CIO	Chief Information Officer
CMS	Centers for Medicare and Medicaid Services
COTS	Commercial off the Shelf

DDI	Design, Development and Implementation
DVHA	Department of Vermont Health Access
EA	Enterprise Architecture/Architect
EPMO	Enterprise Project Management Office
ESB	Enterprise Service Bus
FEA	Federal Enterprise Architecture
FHIR	Fast Healthcare Interoperability Resources
GOTS	Government Off-The-Shelf
HIPAA	Health Insurance Portability and Accountability Act
HIE	Health Information Exchange
HIT	Health Information Technology
IE&E	Integrated Eligibility and Enrollment
KPI	Key Performance Indicator
M&O	Maintenance & Operations
MDM	Master Data Management
MDW	Master Data Warehouse
MITA	Medicaid Information Technology Architecture
MMIS	Medicaid Management Information System
MPI	Master Person Index
NFR	Non-Functional Requirement
NHIN	Nationwide Health Information Network
NHSIA	National Human Services Interoperability Architecture
NIEM	National Information Exchange Model
NIST	National Institute of Standards and Technology
NSA	National Security Agency
OEAF	Oracle Enterprise Architecture Framework
ONC	Office of the National Coordinator for Health Information Technology
PaaS	Platform as a Service
PII	Personally Identifiable Information
PMM	Provider Management Module
RFP	Request for Proposal
SaaS	Software as a Service
SDLC	Software Development Life Cycle
SLA	Service Level Agreement
SMA	State Medicaid Agency; per MITA 3.0 definition, the SMA is responsible for the operation of a Medicaid program.
SME	State Medicaid Enterprise
SOA	Service Oriented Architecture
SOO	Statement of Objectives
SOW	Statement of Work
SS-A	State Self-Assessment
TCO	Total Cost of Operation
TMS	Technical Management Strategy
TOGAF	The Open Group Architecture Framework
VEAF	Vermont Enterprise Architecture Framework

VHIE	Vermont Health Information Exchange
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7 Appendix B: Vermont’s Approach to the Conditions and Standards

#	Conditions and Standards	Vermont Approach
1	Modularity Condition. Use a modular, flexible approach to systems development, including the use of open interfaces and exposed application programming interfaces; the separation of business rules from core programming; and the availability of business rules in both human and machine-readable formats.	<p>Modularity is the key design principle that drives Vermont’s architecture.</p> <ul style="list-style-type: none"> ● Business processes, using Federal standards, including Federal Enterprise Architecture (FEA), MITA, and National Human Services Interoperability Architecture (NHSIA), are designed with common steps and interfaces and then specialized for individual programs so that as business conditions evolve the processes can be prioritized for replacement and improvement modularly. ● Technical systems and applications are designed with a Service Oriented Architecture (SOA) approach. ● Applications are designed to expose documented Application Programming Interfaces (APIs) that can be consumed by other parts of the system. ● Model, View, and Controller are discrete elements of design, keeping data systems (database), display (web or desktop applications), and control logic (rules engine) separated. ● The principles of modularity are explicitly required by non-functional requirements (NFRs) as part of all contracted development and integration work. ● Modular principles are enforced in design work on both State and vendor teams as part of acceptance process. ● Vermont employs an iterative System Development Life Cycle (SDLC) process that modularly deploys functionality, continuously incorporates feedback and appreciates opportunities for improvement, and thereby, reduces risk, by being adaptive to best solutions to meet business problems at any particular moment in time. ● All system interfaces will be open and documented.
2.	MITA Condition. Align to and advance increasingly in MITA maturity for business, architecture, and data.	<p>MITA is a central design standard that drives state work and is a written requirement incorporated into contracts with implementation partners.</p> <ul style="list-style-type: none"> ● Business Process modeling follows the MITA functional taxonomy. ● Requirements are organized and related by MITA processes. ● The State Self-Assessment (SS-A) is an ongoing tool for the State to understand current state and prioritize improvement.
3.	Industry Standards Condition. Ensure alignment with, and incorporation of, industry	All contracted work, as documented by a contract’s statement of work (SOW) or statement of objectives (SOO) explicitly requires

	<p>standards; the Health Insurance Portability and Accountability Act of 1996 security, privacy and transaction standards; accessibility standards established under section 508 of the Rehabilitation Act, or standards that provide greater accessibility for individuals with disabilities, and compliance with Federal civil rights laws; standards adopted by the Secretary under section 1104 of the Affordable Care Act; and standards and protocols adopted by the Secretary under section 15691 of the Affordable Care Act.</p>	<p>compliance to a set of federal and industry open standards including:</p> <ul style="list-style-type: none"> ● ADA and Section 508 Compliance ● Health Insurance Portability and Accountability Act (HIPAA) ● Health Information Technology for Economic and Clinical Health Act of 1996 ● Privacy Act of 1974 ● Patient Protection and Affordable Care Act (ACA) of 2010, Section 1561 ● Safeguarding and Protecting Tax Returns and Return Information (26 U.S. C. 6130 and related provisions) ● National Institution of Standards & Technology (NIST) Special Publications. NIST’s Special Publications are available at: http://csrc.nist.gov/publications/PubsSPs.html ● National Security Agency (NSA) Security Recommendation Guide
<p>4.</p>	<p>Leverage Condition. Promote sharing, leverage, and reuse of Medicaid technologies and systems within and among states.</p>	<p>Enabled by the Modularity Standard, reuse is a key priority of the Medicaid Enterprise, whereby the same processes and technologies can be leveraged across health and human services domains when possible. By maintaining a broad design perspective, each implementation is conceived to be extensible and scalable, to bring on additional service programs as funding and development opportunities become available. Where possible the modules that are being developed for the project will leverage existing State and Agency infrastructure and systems.</p> <p>For instance, the Business Rules Management project begins with health-care focused programs, but the design and implementation of the rules modeling and automation tools are being made in context of the complete catalog of agency policy and programs. An Enterprise Master Client Index is being developed to ensure that client management services are deployed throughout the Medicaid and human services enterprise. Every attempt will be made to adhere to using these already existing systems with each new module developed. Where practical, it is intended that all new modules will be developed in a way that their software will be released under an open source license and could be reused by any other state or human services organization.</p>
<p>5.</p>	<p>Business Results Condition. Support accurate and timely processing of claims (including claims of eligibility),</p>	<p>By thoroughly understanding policy and other program constraints, desired outcomes, and business functions documented as business processes, Vermont has positioned itself to understand if its business is achieving its desired result.</p>

	<p>adjudications, and effective communications with providers, beneficiaries, and the public.</p>	<p>A good example of this dynamic is the integration of the eligibility services with real time determination, verification, and enrollment with robust reporting capability. Every effort on the roadmap has specific associated business metrics. These metrics focus on employee efficiency, reduction of error rate, enhanced client experience, and additional system automation where possible. There are multiple milestones dedicated to increasing the amount of system automation. In addition, the roadmap has improvements for applicants using self-service methods for application and renewal.</p>
<p>6.</p>	<p>Reporting Condition. Produce transaction data, reports, and performance information that would contribute to program evaluation, continuous improvement in business operations, and transparency and accountability.</p>	<p>In order for the agency to understand if it is making progress towards its goals, compliant to the constraints governing its operations, or performing adequately to other expectations and able to recognize opportunities for improvement, robust data and reporting systems must be available to facilitate analytics. Reporting requirements, both prebuilt and ad hoc, are foundational to our project requirements, and Vermont’s architecture is driven by principles of transparency and accountability that can only be realized through mature reporting capabilities.</p>
<p>7.</p>	<p>Interoperability Condition. Ensure seamless coordination and integration with the exchange (whether run by the state or federal government), and allow interoperability with health information exchanges, public health agencies, human services programs, and community organizations providing outreach and enrollment assistance services.</p>	<p>The culmination of all the design standards and principles that drive the State’s architecture is towards a capability of interoperability. Business and technical systems must operate seamlessly together, with high efficiency and accuracy, to enable a client-centric approach that yields a good understanding of client need and circumstances and high-capability to understand how to best meet that need. Given the mixed array of legacy and modern systems across public and private domains, it is challenging to link and exchange information. This dynamic has led to prioritization of master-data tools and indexes, identity and access, and consent management.</p>

8 Appendix C: References

Links to references will be provided as they are available or finalized.

[MITA Framework 3.0](#)

[MITA Data Management Strategy/AHS Data Governance Manual](#)

[MMIS Concept of Operations](#)

[MITA Concept of Operations](#)

[State Self-Assessment \(SS-A\)](#)