

The seal of the State of Kansas is partially visible at the top of the page. It features a semi-circular border with the Latin motto "AD ASTRA PER ASPERA" and a central field containing the word "KANSAS" surrounded by stars.

KANSAS

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# The Kansas Information Technology Architecture

Version 12.0  
July 2011

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**The Kansas Information Technology Architecture is developed by the Kansas Technical Architecture Review Board (KTARB) and was presented to and approved by the Information Technology Executive Council (ITEC) on <date>.**

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## Executive Overview

### ***KITA today***

The KITA V12.0 reflects 2 different views. It reflects the reality of what the state is currently operating and it reflects the direction that we have agreed to move toward. This direction is clarified in Chapter 4 TARGETS. We can not get away from our legacy technology, systems and investments. It will continue to grow and weigh us down. Classifying that legacy using TWILIGHT, CURRENT, EMERGING terms gives us focus on how to view that legacy in terms of support for our future.

The KITA V12.0 is an outcome of legislation (K.S.A. 75-7201 et seq) and is sponsored by the Information Technology Executive Council(ITEC) and the IT community of all branches of government. It provides the Technology aspect of the Kansas Enterprise Architecture (KEA).

The KITA and the Kansas Technical Architecture Review Board provide the mechanisms to exchange ideas on the State strategies (as reflected in latest Strategic Information Management Plan (SIM Plan)) and view of Targets to get to those goals versus agency strategies.

Kansas is working with other states and the federal agencies to move toward a consistent Architecture reference model that we can all refer. This Federal Enterprise Architecture (FEA) and our KEA provide those connections for Kansas. This will help agencies work with peer agencies in other states to share and compare like components and investments.

Future efforts to support our desired outcomes may include some of the following

- Collecting information about all of the State's IT assets in close to real-time to help identify actual investments carried today. Identify the actual numbers of licenses in use in Kansas and identified in the KITA. Identify technologies that are at risk due to obsolescence or isolation in vendor or personnel support.
- Identify what parts of the architecture will be utilized as part of the annual Three Year Plans, which describes the normal evolution of all agencies IT environment.
- Identify what parts of the architecture will be utilized, impacted and/or enhanced as part of major projects in the State of Kansas.
- Continue to develop an exchange relationship with NASCIO and Federal EA communities to exchange architecture models, standards, and solutions.
- Automate the change management of the KITA and improve collaboration for interested communities in parts of the architecture evolution.
- Automate agencies' yearly alignment with the KITA current and target architecture.

### ***Architecture Usage***

The KITA is only useful when it is actively being utilized to help the State of Kansas in every day technology investment decisions. The KITA is also used when IT projects are proposed for Kansas.

If the KITA is actively used the desired outcomes would include:

- Achieving a common view of how IT should be used to support Kansas' mission.
- Reduced barriers to cooperation and information sharing.
- Optimize use of the State's resources (IT and other).

# Part 1

## Architecture scope, concepts, and objectives

# Chapter 1 Introduction

## *Vision*

The vision of the KITA is to deliver an active technical architecture that is used to verify where Kansas currently stands and to focus our future information technology investments on supporting the business needs of State agencies and the citizens of Kansans.

The Kansas Strategic Information Management Plan documents a vision for the use of computers and networks in Kansas:

- **Services:** Support Kansas citizens and businesses so they can access needed Kansas government information and services electronically. KITA Service Reference model describes the Technology service delivery layer. The Targets describe how all government entities will deliver services.
- **Information Sharing:** Every branch and level of Kansas government can exchange and access information electronically, both internally within government and externally throughout the State, nation, and world. KITA supports Targets that describe how we will come together with all State entities to share information.
- **Collaboration:** Formal and informal groups work to break down barriers and provide consistent practices to share investments, efforts, and information in our goal to support our service delivery. KITA describes collaborative environments and content management that bring all thoughts and content together to support physical and virtual collaboration across Kansas.
- **Convergence:** Every tax dollar is maximized through Kansas government cooperation, coordination, and resource sharing, supported by cost-effective information technology. KITA describes the targets that we will be converging on. It also describes twilight and current standards that will need to be moved to the targets. And it describes emerging technologies that have been identified for research and monitoring only.

The Kansas Strategic Information Technology plan, when abstracted to its highest level, calls for the creation of an electronic ability to deliver services via the most effective means available.

## *Mission*

Enterprise Architecture in Kansas will support the entirety of Kansas government functions, processes, performance considerations, information, technology and services. The State of Kansas is moving toward the Federal Enterprise Architecture Reference model with the support of National Association of State Chief Information Officers (NASCIO) and to support our relationships with other states, federal and local agencies.

The Kansas Information Technology Architecture (KITA) is a subset of the Kansas Enterprise Architecture and describes the information systems infrastructure that supports the business and applications used by the State. The purpose of the KITA is to guide the development and evolution of the information systems infrastructure. The KITA establishes consistency by helping:

- Provide managers and staff in the agencies and support services an understanding of the information systems infrastructure they are using and where the State is going.
- Provide a mechanism so State IT professionals have a consistent view of the information systems infrastructure and the methods they should employ to develop and deliver information systems services.
- Ensure the various development projects being managed in the State move us toward a target architecture that is supported by the consensus of agencies and management.

## ***Structure***

This document is in five parts:

- An introduction that provides background information and a description of the development of the architecture and principles that underlie it;
- A description of the target architecture for the future of IT in Kansas;
- An elaboration of the details of the Technical Reference Model (TRM);
- A focus on the details of the Service Reference Model (SRM);
- Appendices.

## ***To Whom Does the Architecture Apply?***

This Architecture applies to the Legislative, Executive, and Judicial Branch Agencies, Boards and Commissions of State Government and includes the Regents Institutions. Although the KITA is not controlling, counties and municipalities are encouraged to develop and implement their enterprise architectures in ways that are consistent with the KITA.

## ***A Note to Vendors***

In this document there are references to specific products as current or emerging standards, although our goal is to have a Standards Based Architecture throughout. In a number of cases we have chosen products as the standard where no widely accepted standards exist, or to achieve reduced total cost of ownership or improved service and support goals. There are several reasons for this including getting the IT community to recognize what they are using daily in the KITA, getting the state to come together on a smaller set of overall solutions for an area. For example, while we may not get to one target but we do not need 20 targets. In many instances, however, equivalent products, could comply with the architecture and meet the stringent requirements for lowest cost acquisitions that the State of Kansas uses in its purchasing decisions. Product equivalence determinations relative to the architecture are made by the Kansas Technology Architecture Review Board.

## ***Scope & Business Rationale***

The KITA will encompass all technology and technology support services that are essential to support an efficient and effective state government. Kansas agencies operate in a federated environment. This environment allows each agency to support their own Information Technology support staffs and budgeting. As a result, there are tremendous efficiencies to be gained when multiple agencies use similar technical and business approaches to accomplish their mission. The savings come in part from the initial investment. But also from the upkeep of each technical component working with all other components that become dependent on it. Savings also come from training on common approaches compared to many outdated or unique technical solutions that require a trained support staff long after the initial team and/or consultant has it working. Finally savings come from business solutions or information that can be shared and standardized across many agencies or branches of government. This allows business solutions or information to be created once and reused many times versus each unique group developing its own solution or collecting its own data.

This architecture describes:

- All of the information technology used and planned for immediate use in the State.
- The architectures of the agency and department applications, but not their application content.
- The ways in which business and information system services are delivered to users.
- The standards and architectural components that are to be used to govern and control the development and delivery of information systems services within the State of Kansas.

The intent is that the KITA will be applied to all agencies and departments in the State of Kansas.

## Target Audiences

The KTARB reviewed the audiences that benefit from the KITA. The following tables, while not inclusive, do give a range of interests and perspectives that we are trying to support.

Primary Audiences		
Legislature		Clarify Convergence, Business support and service delivery.
Governor		
ITEC		

Technology Audiences		
CITO's	<b>ITAB</b>	Identify strategies and similar efforts in other agencies that can be leveraged.
Federal EA council	<b>NASCIO (EA Council)</b>	
Agency CIO's	<b>Agency IT Governance committees</b>	
Technology community of interest		

Government Entities		
Cabinet Heads	<b>Agency Exec IT Governance committees</b>	Understand if we work together how it will affect LOB long term effectiveness
Business community of interest	<b>Federal LOB agency</b>	
Other States		

Other Audiences		
<b>Vendors</b>	<b>Procurement</b>	Understand why we are converging, how it impacts them, some strategies they can use to work with state easier
<b>City/Counties</b>	<b>Citizens</b>	

## Principles

Late in 1998, an agency survey was completed by state IT directors to validate a set of architectural principles for driving key objectives and sub-architecture strategies in developing the statewide architecture. From the responses to the survey a list of architectural principles was developed. When the Kansas Information Technology Architecture Review Board was formed in June of 1999, the preliminary list of principles was modified to better reflect the views of the technical community charged with maintaining the architecture. The following modified list reflects the current effort.

1. *Systems and technology infrastructure implemented by Kansas State government will be compliant with the architecture even though there may be some additional cost for architectural compliance on initial implementation (the cost to optimize for short term or agency benefits is a compounded cost when you combine total skill, evolution cost, etc... for long term).*
2. *We will identify opportunities for cross-functional systems and will implement systems in such a way that we can take advantage of standard components throughout Kansas State government.*
  - *Identical functions within different agencies should be performed with the same system components.*

- *Similar business functions within different agencies should be performed with common components, modified to fit the specific needs of each agency.*
  - *System components developed by one agency should be available for reuse by any other agency.*
  - *Responsibility for developing and supporting each common system component should be vested in a designated lead agency, with participation by all affected agencies.*
3. *Applications and technology components (processors, network, etc.) should be implemented in such a manner that performance measurement and quality assurance data may be captured to support management and analysis of the IT environment.*
4. *Systems and components will use architecturally compliant commercial off-the-shelf (COTS) products where possible.*
5. *The architecture will support all forms of information (data, text, voice, video, image) in an integrated manner.*
6. *All Architecture areas should be considerate of the states need for dependability, stability, and recoverability and will support the necessary levels of privacy, and access to information.*
7. *Applications and technology components (processors, networks, etc.) should be architected in such a manner that the components are separable to be able to evolve independently. This allows part of the architecture and applications that use that part to evolve without wholesale replacement of applications and solutions.*
8. *Every architecture decision should take into consideration the FEA reference architecture, and the other States' architectures, if they have developed a similar architecture, so that technology investments can be minimized when multiple States come together on a project and information between state, federal and local government is optimized.*

## Goals

The overarching goal of the Strategic Information Management Plan is to manage IT from a consolidate approach, to provide citizen access to state services and information and to operate state government as effectively and efficiently as possible. The consolidated management model brings the IT community together to enhance communication and unifies state agencies and boards. This SIM Plan will be managed from a consolidated management philosophy. The SIM Plan Goals include the following:

1. Provide broad access to public information and services.
  - The KITA will support this goal with the clarity of security services and information delivery services to be able to deliver a consistent access model.
2. Use public and private resources effectively and efficiently.
  - By defining the correct combination of COTS components and customized software the state will deliver services and will utilize the IT industry solutions where appropriate. Projects will utilize the KITA for consistence and will support the Project Management Methodology (PMM) that allows use of consultants, or other agency personnel to deliver a solution to the State of Kansas.
  - The KITA evolution to a National Standard Architecture Reference model delivered by the Federal Enterprise Architecture CIO council and supported by the NASCIO Enterprise Architecture committee will allow Kansas to compare and build interstate and intergovernmental solutions with less confusion and overlap.
3. Manage government IT resources effectively and efficiently.
  - The KITA requires that performance measurement and quality assurance data may be captured to support management and analysis of the IT environment.
  - Automated collection of all IT and KITA Assets will clarify where our assets are, who uses them, and will help identify redundancy and underutilization.

- Defining the architecture and products that the state has agreed to support will allow for more efficient procurement practices.
  - By clarifying the relationship between Project Management Methodologies in Kansas and the Architecture, we are helping determine the most effective and efficient implementation of infrastructure to support the business initiatives.
4. Promote economic development and citizen awareness in Kansas, and IT proficiency within Kansas state government.
- By utilizing the Federal Enterprise Architecture as the basis for Kansas we will be able to promote IT proficiency as it supports multiple-state and Federal-State-Local initiatives. This proficiency will pay excellent long term benefits as interstate and intergovernmental sharing of initiatives and information become more common.
  - By clarifying the telecommunication and information sharing strategies of the State of Kansas we can help encourage competition and capabilities needed to support the State of Kansas needs and our business and citizen expectations.
  - By defining the current and target architecture of the State of Kansas we can help direct state and academic education programs to ensure that there is a steady supply of IT skill sets for current and future employees.

Architectures are not developed to bind organizations to inflexible rules; the goals of the architecture are coordination, simplification, improved performance and greater efficiency.

## ***Strategies***

This version of the KITA was developed and is targeted to evolve by utilizing the following strategies:

- Restructuring the KITA in alignment with the Federal Enterprise Architecture (FEA) reference models. Since this is a Technical Architecture the alignment includes the FEA's Technical Reference Model (TRM) and Service Reference Model (SRM). This strategy will allow state systems and projects to be matched and compared with other states and federal capabilities as we evolve together as a nation.
- Setting target architecture will bring visibility into where the state as a whole is going. This will support agency strategic and tactical planning efforts for both business initiatives and technical application and infrastructure initiatives.
- Future strategies:
  - Collecting the assets that make up the architecture with an automated asset inventorying system. The state will move toward a fully automated system to identify the redundancy in technology areas and to ease the burden of reporting assets used by agencies and universities. (Future)
  - Supporting efficiency in procurement and utilization practices. When we have an accurate inventory of the IT Assets in use and we have a clearly identified target architecture we should be able to support the procurement and utilization practices to ensure we have the appropriate contracts and license structures in place for current and future deployments. (Future)

## ***Background***

### ***Legislative Overview***

Kansas statutes organizing information technology coordination at the state level were amended in 1998. K.S.A. 75-7201 et. seq. replaced the Kansas Information Resource Council and the Office of the Chief Information Architect with the Kansas Information Technology Executive Council (ITEC), Executive,

Judicial, and Legislative Chief Information Technology Officers, and the Chief Information Technology Architect.

Adoption of a statewide information technology architecture was explicitly mandated. The portion of K.S.A 75-7201 et. seq. that relates to architecture is:

(a) The information technology executive council is hereby authorized to adopt such policies and rules and regulations as necessary to implement, administer and enforce the provisions of this act.

(b) The council shall:

(1) Adopt:

- Information technology resource policies and procedures and project management methodologies for all State agencies;
- *An information technology architecture, including telecommunications systems, networks and equipment, that covers all State agencies;*
- standards for data management for all State agencies; and
- a strategic information technology management plan for the State;

(2) provide direction and coordination for the application of the State's information technology resources;

(3) designate the ownership of information resource processes and the lead agency for implementation of new technologies and networks shared by multiple agencies in different branches of State government; and

(4) perform such other functions and duties as necessary to carry out the provisions of this act.

The development of the Kansas Information Technology Architecture (KITA) was in direct response to the statutory charge, and the resulting actions required of ITEC and the Information Technology Advisory Board (ITAB).

## ***SIM Plan***

In addition to the Information Technology Architecture, K.S.A 75-7201 et. seq. calls for a Kansas Strategic Information Management Plan (SIM Plan). The goal of the SIM Plan is to coordinate Information Technology (IT) development throughout Kansas State government, thereby promoting citizen access, information sharing, and improved government performance and communications at all levels across governmental boundaries. The Kansas Information Technology Architecture, with the SIM Plan, provides agencies the tools and framework to develop effective and efficient IT systems to meet individual agency needs and the needs of government in the digital age.

## ***Architecture Project Summary***

The development of the Kansas Information Technology Architecture in 1995 was not a small undertaking. Agencies needed a comprehensive technical framework for informed IT decisions, and the development process had to be done expeditiously. The Chief Information Technology Office (CITO) in the executive branch sanctioned the development of the first technical architecture, as well as its ensuing format and context.

The process for the first architecture prototype assembled commercial and governmental resources to provide a format and framework that met the needs of Kansas agencies and departments.

Since that original adoption, the Architecture has continued to develop, and is approaching a Maturity Level 4 as measured by the Enterprise Architecture Maturity Model (EAMM) of the National Association of State Chief Information Officers (NASCIO).

The architecture must continue to improve. With the KITA V11 release we modified it so it fits cleanly with the developing Federal Enterprise Architecture (see: <http://www.feapmo.gov/fea.htm>) and the GIS Architecture being developed by NSGIC. This was the start of being able to define a full Enterprise Architecture strategy for Kansas with the inclusion of a recognized Business Enterprise Architecture.

The scope of KITA V12 will take a dramatic leap forward in clarity for the Technical managers and project teams in Kansas. The addition of a major component in each section to call out the products that the KTARB and CITA is establishing as the enterprise direction will focus our efforts and decisions on a very few products in each category.

This update effort was initiated in February 2010.

March 2010	KTARB Conducts KITA V12 kickoff.
April-June	KITA based standards and product surveys to agencies.
Sept-Jan 2011	KTARB refines product based recommendations for TRM chapters 5-8
Feb 2011	KITA version 12 finalized, Published presented to ITAB
April 2011	KITA Version 12 presented to ITEC
April 2011	Subcommittee wrap-up meeting occurred, KITA version 12 process completed.

## ***Architecture Project Team***

The development of the KITA is supported by the Kansas Technical Architecture Review Board (KTARB). KTARB is responsible for keeping the architecture up to date. It determines architectural compliance by evaluating agency requests for waiver and analyzing projects referred to it. It also makes recommendations to the Information Technology Executive Council on changes and extensions to the KITA. It is chaired by the Chief Information Technology Architect in accordance with ITEC Policy 4000, 4010, and 4020.

The Subcommittees are staffed from the State's technical expert community who provide the basis of technical architecture decisions. The subcommittees have the option to invite members of private sector or vendor communities with the request and approval of the subcommittee lead. Please see Appendix I for subcommittee descriptions and members.

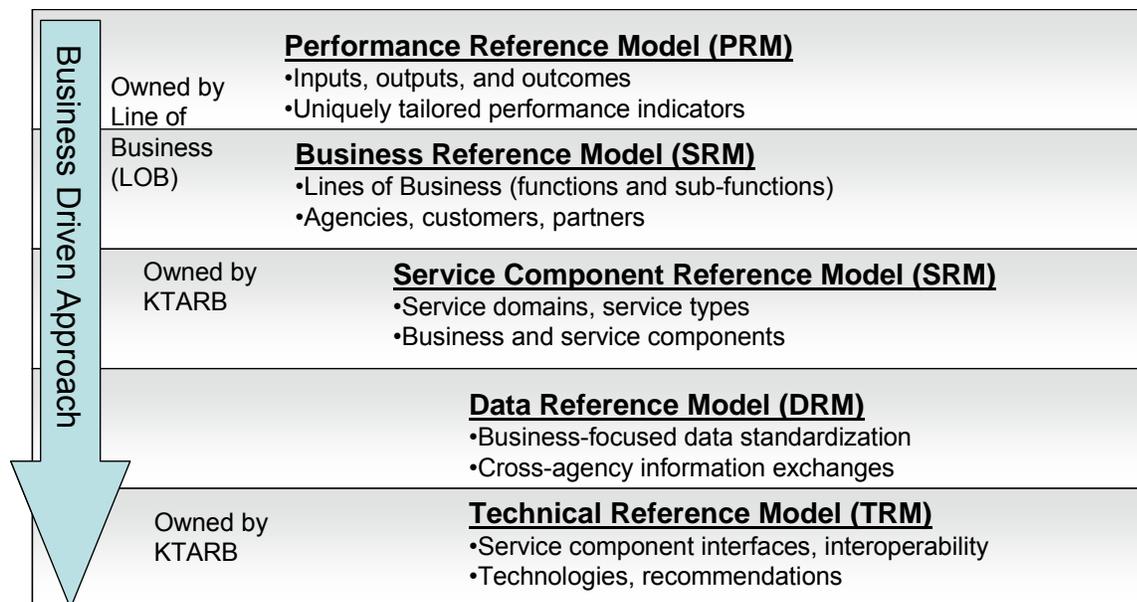
# Chapter 2 Kansas Enterprise Architecture

## Overview

The KITA is part of a set of interrelated “reference models” designed to facilitate cross-agency analysis and the identification of duplicative investments, gaps and opportunities for collaboration within and across agencies. Collectively, the reference models comprise a framework for describing important elements of the Kansas Enterprise Architecture KEA in a common and consistent way. The KEA is modeled after the Federal Enterprise Architecture (FEA) and follows directions established by the NASCIO Enterprise Architecture Working group as a means to align Federal-State-Local business and IT efforts.

Through the use of this common framework and vocabulary, IT portfolios can be better managed and leveraged across the state government. This chapter introduces the purposes and structures of the five KEA reference models:

- Performance Reference Model (PRM)
- Business Reference Model (BRM)
- Service Component Reference Model (SRM)
- Technical Reference Model (TRM)
- Data Reference Model (DRM)



### Performance Reference Model (PRM)

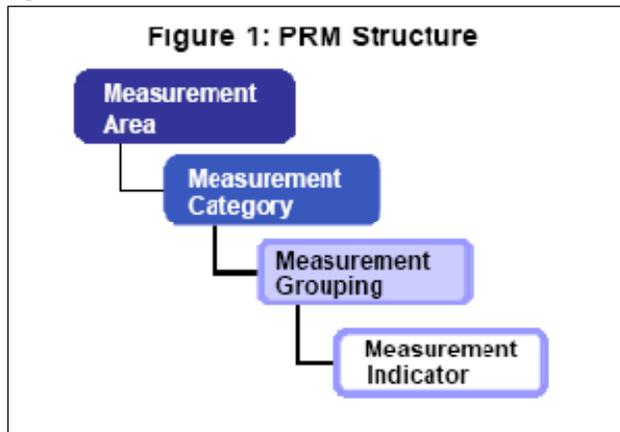
The PRM is a framework for performance measurement providing common output measurements throughout the state government. It allows agencies to better manage the business of government at a strategic level, by providing a means for using an agency’s EA to measure the success of IT investments and their impact on strategic outcomes. The PRM accomplishes these goals by establishing a common language by which agency Enterprise Architects (EA) can describe the outputs and measures used to achieve program and business objectives. The model articulates the linkage between internal business components and the achievement of business and customer-centric outputs. Most importantly, it facilitates resource allocation decisions based on comparative determinations of which programs and organizations are more efficient and effective. The PRM focuses on three main objectives:

- Help produce enhanced performance information to improve strategic and daily decision making;

- Improve the alignment and better articulate the contribution of inputs to outputs, thereby creating a clear “line of sight” to desired results;
- Identify performance improvement opportunities that span traditional organizational structures and boundaries.

The PRM structure is designed to clearly express the cause-and-effect relationship between inputs and outputs. This “line of sight” is articulated through the use of the Measurement Area, Category, Grouping, and Indicator hierarchy. Refer to Figure 1 for the PRM structure.

**Figure 1: PRM Structure**



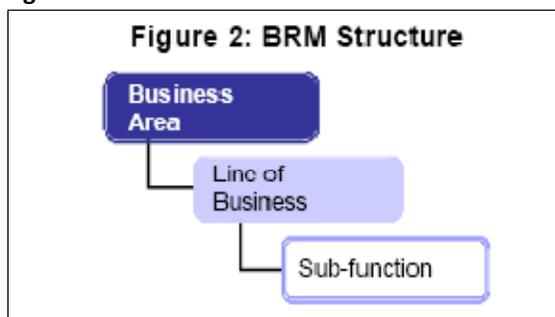
### **Business Reference Model (BRM)**

The BRM provides a framework that facilitates a functional (rather than an organizational) view of the state government’s lines of business (LOBs), including its internal operations and its services for citizens, independent of the agencies, bureaus and offices that perform them. The BRM maps the state government around common business areas instead of through a stove-piped, agency-by-agency view. It thus promotes agency collaboration and serves as the underlying foundation for the KEA and E-Gov strategies.

While the BRM does provide an improved way of thinking about government operations, its true utility as a model can only be realized when agencies effectively use it. The functional approach promoted by the BRM will do little to help accomplish the E-Gov strategic goals if it is not incorporated into business-focused enterprise architectures and the management processes of the State of Kansas. This is also known as the Enterprise Business Architecture (EBA) by the NASCIO EA community. This is one of the 2008 SIM Plan strategies to be completed by all agencies so that government services could be understood and mapped consistently across all branches and levels of government.

The BRM is structured into a tiered hierarchy representing the business functions of the state government. Refer to Figure 2 for the BRM tiered hierarchy.

**Figure 2: BRM Structure**

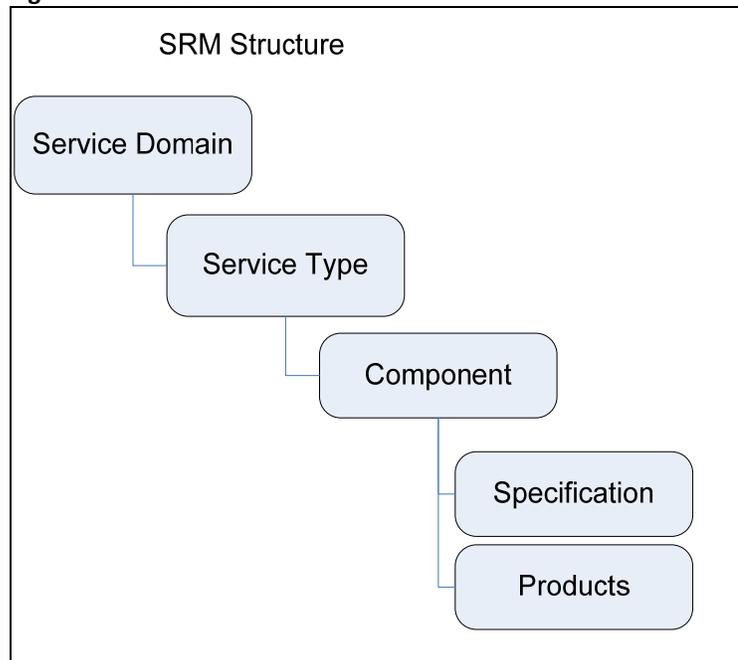


### Service Component Reference Model (SRM)

The SRM is a business-driven, functional framework classifying Service Components according to how they support business and performance objectives. It serves to identify and classify horizontal and vertical Service Components supporting federal agencies and their IT investments and assets. The model aids in recommending service capabilities to support the reuse of business components and services across the federal government.

The SRM is organized across horizontal service areas, independent of the business functions, providing a leverageable foundation for reuse of applications, application capabilities, components, and business services. It is structured hierarchically as depicted in Figure 3.

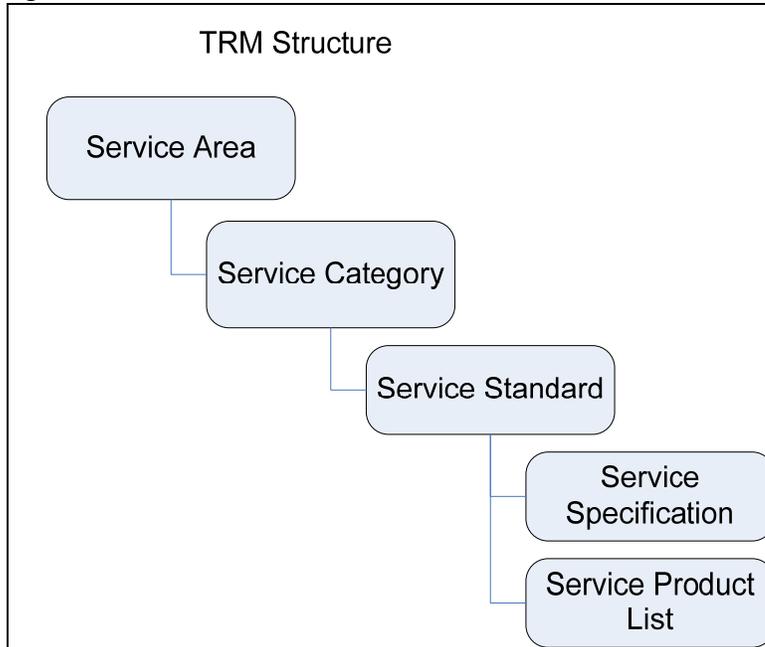
**Figure 3: SRM Structure**



### Technical Reference Model (TRM)

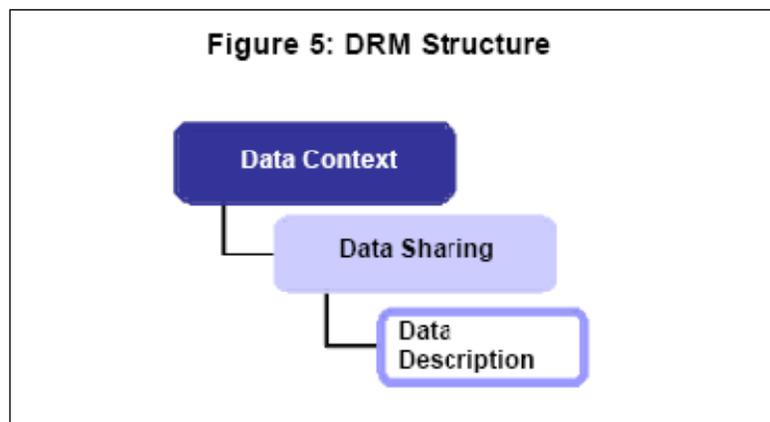
The TRM is a component-driven, technical framework that categorizes the standards and technologies to support and enable the delivery of Service Components and capabilities. It also unifies existing agency TRMs and E-Gov guidance by providing a foundation to advance the reuse and standardization of technology and Service Components from a government-wide perspective.

Aligning agency capital investments to the TRM leverages a common, standardized vocabulary, allowing interagency discovery, collaboration, and interoperability. Agencies and the state government will benefit from economies of scale by identifying and reusing the best solutions and technologies to support their business functions, mission, and target architecture. The TRM structure is depicted in Figure 4.

**Figure 4: TRM Structure****Data Reference Model (DRM)**

The KEA Data Reference Model (DRM) is intended to promote the common identification, use, and appropriate sharing of data/information across the state government through its standardization of data in the following three areas: data context, data sharing, and data description (refer to Figure 5).

The current published version of the FEA DRM is undergoing revision. The FEA PMO is collaborating with members of the interagency DRM working group, chartered by the Architecture and Infrastructure Committee (AIC) of the Chief Information Officer (CIO) Council, to further enhance and improve this reference model. The DRM structure presented in Figure 5 is the updated description of the DRM based on the work being done by the FEA PMO and the interagency DRM working group. Because the new version of the DRM has not been completed, the latest published version is provided in this document for reference.

**Figure 5: DRM Structure**

## KEA Profiles

A profile is a framework that cross-cuts the inter-related KEA reference models based upon a particular subject matter. The profiles describe how each reference model addresses a specific area and how agencies can utilize existing resources, standards, best practices, and use cases to implement or improve upon them. The following is a list of profiles that are under development by the FEA council

- **Security and Privacy Profile:** provides guidance on designing and deploying measures that ensure the protection of information resources.  
[Security and Privacy Profile](#)
- **Geospatial Profile (in development):** establishes a framework for more effective use and management of geospatial data and services as part of agencies' enterprise architectures. It describes how agencies can leverage geospatial data and technologies to enhance service delivery and mission accomplishment.  
[FEA Geospatial Profile, version 1.1](#)
- **Records Management Profile:** provides an overview of the FEA and explains how the reference models provide a context for applying effective records management practices.  
[Federal Enterprise Architecture Records Management Profile](#)

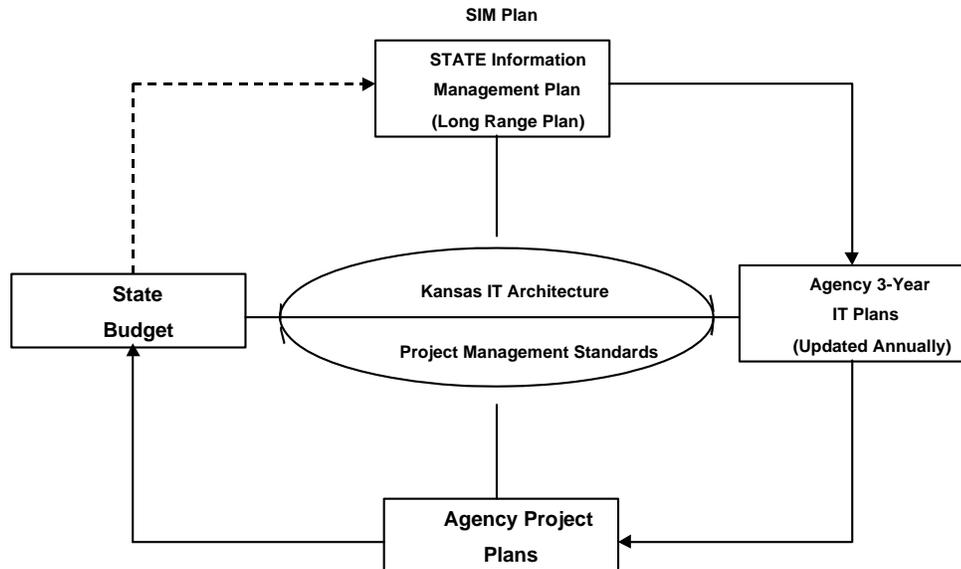
It is intended that Kansas will develop a series of profiles to support our cross cutting efforts. Due to the complexity and interrelations of our environment, Therefore gives us several advantages to separating the architecture details and aligning them with the KEA/FEA reference models as well as bringing together a complete picture for groups to use as a model for future development efforts. These profiles will be a first attempt with this version of the KITA and will be considered a work in progress as we develop them and refine their usage in context of projects and IT management.

## Chapter 3 Architecture Governance

### 3.1 Relationships with other management concepts

This architecture is one of several architectures and sets of information systems documents. The relationships between the architectures and management concepts are shown in Figure 6.

**Figure 6: Kansas IT Planning/Controls**



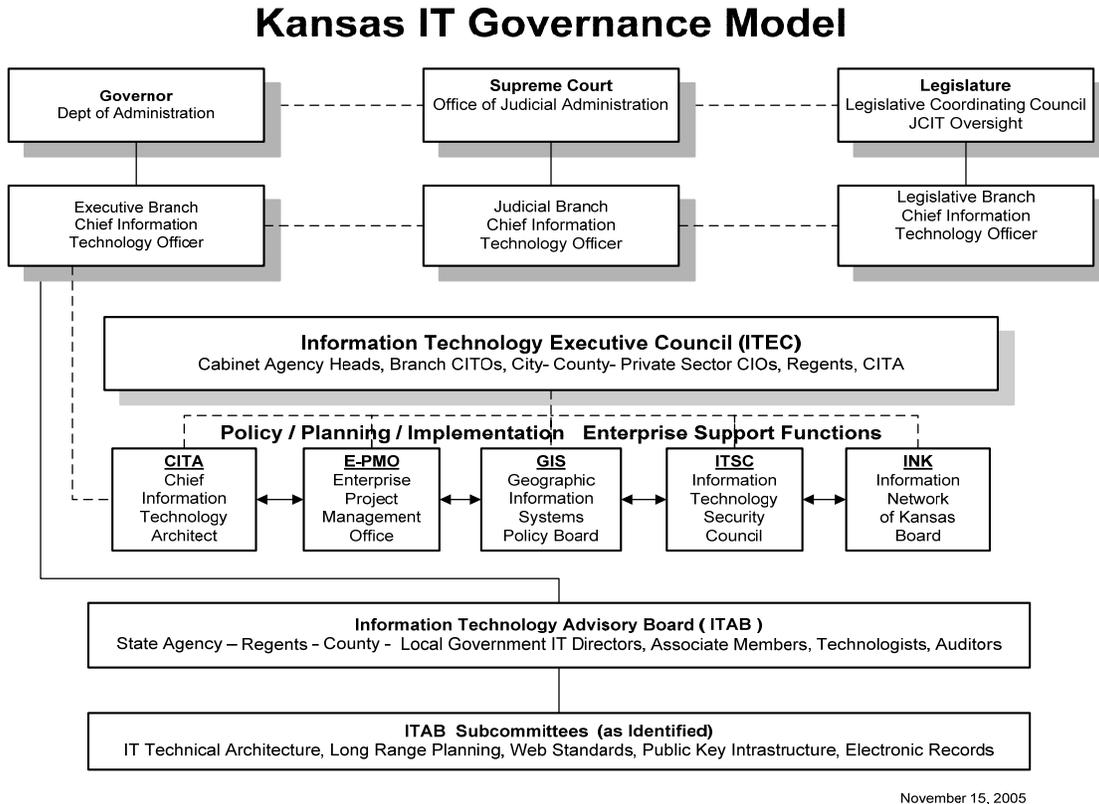
These concepts are described as:

- Strategic Information Management Plan (SIM Plan) updated every 2-3 years to provide updated strategic vision and objectives to enable and support government in Kansas.
- Kansas IT Architecture - The infrastructure that underpins the applications used within the State. This is the Technical and Service architecture and sub-architectures described in the rest of this document.
- Process and applications architectures – These elements are covered under K.S.A 75-7201 et seq., which calls for IT resource policies, procedures, and project management methodologies for all State agencies. Specific processes and policies that already exist will be identified and linked to sub-architecture elements within this document.
- Agency 3 year IT management and budget plans- Tactical Agency Plans (Engineering documents) – Development of an agency level technical architecture leads to a number of engineering documents. These documents will be created and maintained at the agency and department level.
- Project architectures – Developed for individual projects at a lower level to describe the changes being made by each project.

### 3.2 State IT Governance, Architecture Responsibility

A hierarchy of committees and organizations are involved with the long-term use and direction of the KITA. The relationships and organization of these groups is depicted in Figure 7.

**Figure 7: KITA Governance Organization**



Organization	Architecture Responsibility
ITEC	Approve and oversee architecture directions through the CITA
CITO	Project approval implies architecture compliance
CITA	Architecture development responsibility under ITEC
ITAB	Provides membership to the Technology Architecture Review Board
IT Technical Architecture Board (KTARB)	Care and maintenance of KITA Reports to ITAB on new directions, standards
Architecture Sub-committees	Developed as needed to validate or update technical subsections of the KITA
Individual Agencies/ RITC / Regents	Provide feedback on KITA and comment to CITA Determine architecture compliance (checklists) for any new projects Determine architecture compliance with any new purchase Develop transition plans for KITA twilight components Test new technologies and notify KTARB for Emerging technologies Develop transition plans to KITA Targets

Organization	Architecture Responsibility
Procurement	Removed from an IT policing role, now follows CITO approved requests for IT systems

### 3.3 *Architecture Compliance, Enforcement*

The architecture embodies a vision, a view of the future of information technology in the State. The architecture defined herein has taken as the definitive statement of that vision the work of the Kansas Strategic Information Management Plan. The commitment has been made to craft this architecture with the widest possible participation from members of the IT community within Kansas State government. Broad agreement with the standards and guidelines is sought as the architecture evolves.

The project approval process, as defined in K.S.A 75-7201 et. seq., should allow for the resolution of any architectural variances that may emerge over time. The architecture is intended to evolve as technology develops and as new initiatives emerge within the vast technology and organizational domains it spans.

In essence, the approval process coordinates many interests, including management, branch CITO, budget, and finally legislative committees.

- Non-compliance with the architecture is BAD
- Compliance with Current Standard is GOOD
- Compliance with Target is GREAT

Architectures are not developed to bind organizations to inflexible rules; the goals of the architecture are coordination, simplification, improved performance and greater efficiency.

### 3.4 *Organization of this Document*

The following chapters contain the sub-architecture details of the KITA. Each chapter is structured for easy reader access to information and technical content necessary in decision-making. Each chapter is organized with the following sections:

- Definition – A brief statement to set perspective and need for the sub-architecture.
- General Standards – Categorical tables that list the current standards, twilight standard, emerging standards and targets that apply to that element.
  - **Twilight Standards** (or retired technologies) are those that should be discouraged from future implementation. This is not to imply that existing resources should be rooted-out and replaced, but that the use of these products and services should not be extended in future planning and development.
  - **Current Standards** are the preferred directions and products that should impact project behavior when making implementation and design decisions. Products and technologies that fit in the phase 2, or current lifecycle as outlined in Section 3.4 above are in the current standard definitions. General State directions and emphasis will center around elements of this category.
  - **Emerging Standards** (or introductory technologies) include near-term directions and options that need continued monitoring to find applicability within the State IT infrastructure. Included are technologies that are not yet fully production-worthy, but are potential candidates for future implementations. Advanced users of technology, such as academic researchers in the State Universities, will be the first implementers of these technologies.

Continued market acceptance and adaptation will move these solutions toward the growth phase of the lifecycle, and inclusion in the statewide architecture may become possible.

- **Targets** are the direction that the state as a whole (or defined subset) has determined is the best long term approach. The target may be a combination of emerging and current standards. They may also be a reflection of the anticipated natural evolution of a technology area. Targets are the hardest to establish. While not every area needs to establish targets the clearer we can be on the enterprise targets the easier it is to align agency and State of Kansas initiatives. Targets allow Kansas to move outside of the tactical architecture issues and allow Kansas to look three to ten years into the future to forecast our evolution toward a more effective set of technology solutions.
- Context and Diagrams: Where applicable, high level views are outlined that describe the domain for each of the architecture sections.
- Related Policies and Procedures: Includes a listing of related (and published) Kansas standards, guidelines, and procedures that relate to the architecture category. This information is provided primarily for reference.
- Technical Product and Configuration Information: Provides reference to specific products with notes regarding their characteristics and use within Kansas government systems.

### ***3.5 Bringing the State together via Architecture***

Reading the previous 2 sections it is easy to identify that there will be many standards at any given time and that some standards can become targets. What we hope to achieve by using a single architecture for all state agencies is to bring all state agencies together to a smaller set of overall solutions.

- Instead of 20 email systems we get to 1 or 2
- Instead of 20 ways to write and deliver reports to people we get to 1 or 2
- Instead of 20 ways to share information with our peer agencies, states, federal partners we get to 1 or 2.
- Instead of 20 ways to capture and redistribute financial information we get to 1 or 2
- Instead of 20 ways for our business partners to exchange information with us we get to 1 or 2.

We will not get to this goal overnight, it will take a lot of continual dialog to keep investment choices visible to all parties who could eventually be able to leverage those investments. So instead of one agency doing research and buying a best product that fits their needs and then asks for that product to be put into the KITA as a standard we would need to get the subject matter experts to rationalize that investment and map a strategy to deploy that investment to all agencies. and to recognize that the decision, once made, on that product and standard discussion, is closed for foreseeable future.

Decision on how you get to a target should be based upon the best information available but the following criteria should be available to the decision makers.

- Market share of the product.
- Existing presence in Kansas State agencies.
- Cost of product and alternatives.
- Integration with other KITA environments (scale of effort to deploy).
- Skills available in state agencies (our employees move between agencies and if they get trained it is better to use that training than to start over).
- Stability of company, financial, leadership.
- Company focus on public sector and government (federal, state local).

## Part 2

# KITA Target Summary

## Chapter 4 KITA Targets

### *Evolution Forecast & Implementation*

Targets are the direction that the State as a whole has determined is the best long term technological approach. The target may be a combination of emerging and current standards. They may also be a reflection of the anticipated natural evolution of a technology area. Targets are the hardest to establish. While not every area needs to establish targets, the clearer we can be on the enterprise targets the easier it is to align agency and State of Kansas initiatives. Targets allow Kansas to move outside of the tactical architecture issues to look two to ten years into the future to forecast our evolution toward a more effective set of technical solutions. The target may be an initiative in itself to establish a focus group, research, pilot, program definition, multi year rollout plan, etc.

The KTARB Subcommittees were established and populated by subject matter experts in state government. The KTARB members are also all long term career IT subject experts. The collection of thoughts from these teams allows Kansas to have the discussion about appropriate technological targets.

The KITA Targets are a series of compromises that balance:

- The need for common skills versus unique skill sets for each solution
- The need to leverage purchasing power of state versus the need to protect past product investment decisions;
- The need to come together as a state versus need to support unique agency requirements;
- The need to use COTS software versus the need to build solutions to support unique agency processes and practices;
- The need to look at cross agency common services versus a unique service suite for each agency;
- The need to support and evolve legacy systems versus best of breed next generation systems;
- The need to keep IT investment cost to absolute minimum versus the need to bring consistent functionality and solutions to the state and agencies that have a high degree of interaction.

This effort will help frame our discussions about the architectural evolution and will bring multiple agencies to the table to look for the right combination of compromises. While we know it is not wise to support twenty or more email systems, we are not sure what the right number is. Is the right number 1, 2 or 5 or 20? While we know it is not wise to have 30 different content management systems, is the right number 1 or 2 or more?

## Kansas Technical Reference Model (TRM) Overview

The TRM is a component-driven, technical framework that categorizes the standards and technologies to support and enable the delivery of Service Components and capabilities. It also unifies existing agency TRMs and E-Gov guidance by providing a foundation to advance the reuse and standardization of technology and Service Components from a government-wide perspective.

Aligning agency capital investments to the TRM leverages a common, standardized vocabulary, allowing interagency discovery, collaboration, and interoperability. Agencies and the state government will benefit from economies of scale by identifying and reusing the best solutions and technologies to support their business functions, mission, and target architecture. The TRM is broken down into the following sections:

This chart shows the entire TRM details and their locations. Note that we will not have Targets established for every TRM section with this version of the KITA.

<b>Chapter 5 - Service Access and Delivery</b>	
<ul style="list-style-type: none"> <li>• 5.1 Access Channels <i>Web Browser, Wireless / PDA, Collaboration / Communication, Other Electronic Channels</i></li> <li>• 5.2 Delivery Channels <i>Internet, Intranet, Extranet, Peer to Peer, Virtual Private Network</i></li> </ul>	<ul style="list-style-type: none"> <li>• 5.3 Service Requirements <i>Legislative / Compliance, Authentication / Single Sign-On, Hosting</i></li> <li>• 5.4 Service Transport <i>Supporting Network Services, Service Transport</i></li> </ul>
<b>Chapter 6 - Service Platform and Infrastructure</b>	
<ul style="list-style-type: none"> <li>• 6.1 Support Platforms <i>Wireless / Mobile, Platform Independent. Platform Dependant</i></li> <li>• 6.2 Delivery Servers <i>Web Servers, Media Servers, Application Servers, Portal Servers</i></li> <li>• 6.3 Software Engineering <i>Integrated Development Environment, Software Configuration Management, Test Management, Modeling</i></li> </ul>	<ul style="list-style-type: none"> <li>• 6.4 Databases / Storage <i>Databases, Storage</i></li> <li>• 6.5 Hardware / Infrastructure <i>Servers / Computers, Embedded Technology Devices, Peripherals, Wide Area Network, Local Area Network, Network Devices / Standards, Video Conferencing</i></li> </ul>
<b>Chapter 7 - Component Framework</b>	
<ul style="list-style-type: none"> <li>• 7.1 Security <i>Certificates / Digital Signatures. Supporting Security Services</i></li> <li>• 7.2 Presentation / Interface <i>Static Display, Dynamic / Server Side Display, Content Rendering, Wireless / Mobile / Voice</i></li> </ul>	<ul style="list-style-type: none"> <li>• 7.3 Business Logic <i>Platform Independent, Platform Dependent</i></li> <li>• 7.4 Data Interchange <i>Data Exchange</i></li> <li>• 7.5 Data Management <i>Database Connectivity, Reporting and Analysis</i></li> </ul>
<b>Chapter 8 - Service Interface and Integration</b>	
<ul style="list-style-type: none"> <li>• 8.1 Integration <i>Middleware. Enterprise Application Integration</i></li> <li>• 8.2 Interoperability <i>Data Formats / Classification, Data Types / Validation, Data Transformation</i></li> </ul>	<ul style="list-style-type: none"> <li>• 8.3 Interface <i>Service Delivery, Service Description / Interface</i></li> </ul>

The following charts only include Product Targets. Please refer to the appropriate chapter listed above as you look at the chapter references for Standards Target and additional details.

Chapter 5. Service access & Delivery	TRM Component group	TARGET
<b><u>5.1 Access Channels</u></b>		
5.1.1 Web Browser		Microsoft Internet Explorer Mozilla Firefox Apple Safari
5.1.2 Wireless/PDA	Smart Phones	RIM Blackberry Apple iPhone
5.1.3 Collaboration/communication	Electronic Mail	Microsoft Exchange
	Collaboration Environments	Microsoft SharePoint
<b><u>5.2 Delivery Channels</u></b>		
5.2.2 Intranet		Internet 1 Internet 2
5.2.5 Virtual Private Networks		Cisco VPN Cisco GetVPN Netmotion
<b><u>5.3 Service Requirements</u></b>		
5.3.2 Authentication / Single Sign On		Microsoft Active Directory LDAP
<b><u>5.4 Service Transport</u></b>		
5.4.1 Supporting Network Devices	Directory Integration	Microsoft Active Directory
5.4.2 Service Transport	Internet File Transfer	CoreFTP Microsoft FTP WSFTP

Chapter 6. Service Platform & Infrastructure	TRM Component group	TARGET
<b><u>6.1 Supporting Platforms</u></b>		
6.1.2 Platform Independent	Operating Systems	Red Hat Enterprise Linux
6.1.3 Platform dependent	Desktop Operating Systems	Windows 7
	Midtier Server/OS	Windows 2008 Solaris 10
	Mainframe OS	Z/OS
	Server Virtualization Platform	VMWare
<b><u>6.2 Delivery Servers</u></b>		
6.2.1 Web Servers		Apache (open platform) Microsoft IIS (.Net platform)
<b><u>6.3 Software Engineering</u></b>		
6.3.4 Modeling		Metastorm ProVision

<b>Chapter 6. Service Platform &amp; Infrastructure</b>	<b>TRM Component group</b>	<b>TARGET</b>
		Microsoft Visio
<b><u>6.4 Database/Storage</u></b>		
<b>6.4.1 Database</b>	Server Databases	Oracle Microsoft SQL Server mySQL Server
<b><u>6.5 Hardware Infrastructure</u></b>		
<b>6.5.4 Wide Area Networks</b>	Media - Fiber	Cisco Dense Wavelength Division Multiplexing
	Wireless Point To Point	Aruba Wireless
	OSI Layer 2	Cisco Switches
	OSI Layer 3	Cisco Routers
<b>6.5.5 Local Area Networks</b>	OSI Layer 2	Cisco Switches
	OSI Layer 3	Cisco Routers
<b>6.5.6 Network Devices / Standards</b>	OSI Layer 2	Cisco Switches
	OSI Layer 3	Cisco Routers
<b>6.5.7 Video Conferencing</b>	Telephone Video	Cisco 9971 Video Phone
	Desktop Video	Microsoft Lync Cisco CUPC
	Dedicated Conferencing Solutions	Cisco/Tanberg Products Polycom Products
	Telepresence	Cisco Telepresence

<b>Chapter 7. Component Framework</b>	<b>TRM Component group</b>	<b>TARGET</b>
<b><u>7.1 Security</u></b>		
<b>7.1.1 Certificates / Digital Signatures</b>		State of Kansas PKI
<b>7.1.2 Electronic Signatures</b>		State of Kansas PKI
<b><u>7.2 Presentation / Interface</u></b>		
<b>7.2.4 Wireless / Mobile / Voice</b>		Microsoft Lync Cisco VoIP

Chapter 8. Service Interface & Integration	TRM Component group	TARGET
<b><u>8.2 Interoperability</u></b>		
<b>8.2.1 Data format &amp; Classification</b>	Text	<b>Microsoft Word</b>
	Raster Image	<b>Adobe Photoshop ESRI ARC Editor</b>
	Vector Graphics	<b>Microsoft Visio ESRI ARC Editor</b>
	Spreadsheet	<b>Microsoft Excel</b>
	Database	<b>Microsoft Access</b>
	Presentation	<b>Microsoft PowerPoint</b>

## Kansas Service Component Reference Model Overview

The SRM is a business-driven, functional framework classifying Service Components according to how they support business and performance objectives. It serves to identify and classify horizontal and vertical Service Components supporting federal agencies and their IT investments and assets. The model aids in recommending service capabilities to support the reuse of business components and services across the federal government.

The SRM is organized across horizontal service areas, independent of the business functions, providing a leverageable foundation for reuse of applications, application capabilities, components, and business services.

This chart show the entire SRM details and their locations. Note that we will not have Targets established for every SRM section with this version of the KITA

Chapter 9 - Customer Service	
<ul style="list-style-type: none"> <li>9.1 Customer Relationship Management <i>Call Center Management, Customer Analytics, Sales and Marketing, Product Management, Brand Management, Customer / Account Management, Customer Feedback, Surveys</i></li> </ul>	<ul style="list-style-type: none"> <li>9.2 Customer Preferences <i>Personalization, Subscriptions, Alerts and Notifications</i></li> <li>9.3 Customer Initiated Assistance <i>Online Help, Online Tutorials, Self-Service, Reservations / Registration, Multi-Lingual Support, Assistance Request, Scheduling</i></li> </ul>
Chapter 10 - Process Automation	
<ul style="list-style-type: none"> <li>10.1 Tracking and Workflow <i>Process Tracking, Case Management, Conflict Resolution</i></li> </ul>	<ul style="list-style-type: none"> <li>10.2 Routing and Scheduling <i>Inbound Correspondence Management, Outbound Correspondence Management</i></li> </ul>
Chapter 11 - Business Management Services	
<ul style="list-style-type: none"> <li>11.1 Management of Process <i>Change Management, Configuration Management, Requirements Management, Program / Project Management, Quality Management, Business Rule Management, Risk Management</i></li> </ul>	<ul style="list-style-type: none"> <li>11.2 Organization Management <i>Workgroup / Groupware, Network Management</i></li> <li>11.3 Investment Management <i>Strategic Planning and Management, Portfolio Management, Performance Management</i></li> </ul>
Chapter 12 - Digital Asset Management	
<ul style="list-style-type: none"> <li>12.1 Content Management <i>Content Authoring, Content Review and Approval, Tagging and Aggregation, Content Publishing and Delivery, Syndication Management</i></li> <li>12.2 Document Management <i>Document Imaging and OCR, Document Referencing, Document Revisions, Library / Storage, document Review and Approval, Document Conversion, Indexing, Classification</i></li> </ul>	<ul style="list-style-type: none"> <li>12.3 Knowledge Management <i>Information Retrieval, Information Mapping / Taxonomy, Information Sharing, Categorization, Knowledge Engineering, Knowledge Capture, Knowledge Distribution and Delivery, Smart Documents</i></li> <li>12.4 Records Management <i>Records Linking / Association, Document Classification, Document Retirement, Digital Rights Management</i></li> </ul>

Chapter 13 - Business Analytical Services	
<ul style="list-style-type: none"> <li>13.1 Analysis and Statistics <i>Mathematical, Structural / Thermal, Radiological, Forensics</i></li> <li>13.2 Visualization <i>Graphing / Charting, Imagery, Multimedia, Mapping / Geospatial / Elevation / GPS, CAD</i></li> </ul>	<ul style="list-style-type: none"> <li>13.3 Knowledge Discovery <i>Data Mining, Modeling, Simulation</i></li> <li>13.4 Business Intelligence <i>Demand Forecasting / Management, Balanced Scorecard, Decision Support and Planning</i></li> <li>13.5 Reporting <i>Ad Hoc, Standardized / Canned, OLAP</i></li> </ul>
Chapter 14 - Back Office Support	
<ul style="list-style-type: none"> <li>14.1 Data Management <i>Data Exchange, Data Mart, Data Warehouse, Meta Data Management, Data Cleansing, Extraction and Transformation, Loading and Archiving, Data Recovery, Data Classification</i></li> </ul>	<ul style="list-style-type: none"> <li>14.2 Assets / Materials Management <i>Computes / Automation Management</i></li> <li>14.3 Development and Integration <i>Legacy Integration, Enterprise Application Integration, Data Integration, Instrumentation and Testing, Software Development</i></li> </ul>
Chapter 15 - Support Services	
<ul style="list-style-type: none"> <li>15.1 Security Management <i>Identification and Authentication, Access Control, Encryption, Intrusion Detection, Verification, Digital Signatures, User Management, Role / Privilege Management, Audit Trail and Capture, Forensics, Incident Response, Risk Management</i></li> <li>15.2 Collaboration <i>Email, Threaded Discussions, Document Library, Shared Calendaring, Task Management</i></li> <li>15.3 Search <i>Query, Precision / Recall Ranking, classification, Pattern Matching</i></li> </ul>	<ul style="list-style-type: none"> <li>15.4 Communication <i>Real Time Chat / Instant Messaging, Audio Conferencing, Video Conferencing, Event / News Management, Community Management, computer Telephony Integration, Voice Communications</i></li> <li>15.5 Systems Management <i>License Management, Remote Systems Control, System Resource Monitoring, Software Distribution, Issue Tracking</i></li> <li>15.6 Forms Management <i>Forms Creation, Forms Modification</i></li> </ul>

Please refer to the appropriate chapter listed above as you look at the Chapter references of the Target details.

Chapter 9. Customer Services	SRM Component group	TARGET
<b>9.1 Customer Relationship Management</b>		
<b>9.1.1 Call Center Management</b>	Service Desk and Incident Management and Resolution	<b>Integrated automated hardware, application, and network management tools to proactively alert service desk staff to potential problems</b>

Chapter 10. Process Automation	SRM Component group	TARGET
<b>10.1 Tracking and Workflow</b>		
<b>10.1.1 Process Tracking</b>	Access	Supports both Internal and External Access
	Security	Usage of electronic / digital signatures or certificates  Auditing capabilities
	Processing	Parallel processing
	Workflow	Supports functions such as: <ul style="list-style-type: none"> <li>• Process definition and mapping</li> <li>• Routing</li> <li>• Event triggers based on time, date, process completion, etc.</li> <li>• Group assignments</li> <li>• Individual assignments</li> <li>• Status reporting</li> </ul> Can be tailored to domain-specific processes such as telecommunications management, service desk event management, document processing, personnel hiring, interlibrary loan requests, etc.
<b>10.1.2 Case Management</b>	Case Management	Data and communications protocol interoperability for inter-agency communications within the State, within the region, or nationally (i.e. communication with federal agencies)
<b>10.1.3 Conflict Resolution</b>	Business Rules	Functions include: <ul style="list-style-type: none"> <li>• Rules composition</li> <li>• Rules deployment</li> <li>• Run-time engine</li> <li>• Component process and terminology definition <ul style="list-style-type: none"> <li>○ Matching</li> <li>○ Conflict resolution</li> <li>○ Action</li> </ul> </li> <li>• Rule set tracking</li> <li>• Policy testing tools</li> <li>• Authorization</li> </ul> Rule Interchange Format
<b>10.2 Routing and Scheduling</b>		
<b>10.2.1 Inbound Correspondence Management</b>	Correspondence Management	Functions include: <ul style="list-style-type: none"> <li>• Ability to capture and manage both electronic and paper inbound communications</li> <li>• Security for confidential correspondence</li> <li>• Workflow scheduling</li> <li>• Classification / categorization</li> <li>• Rules</li> <li>• Metadata creation and management</li> <li>• Search</li> <li>• Tracking</li> </ul>

Chapter 10. Process Automation	SRM Component group	TARGET
		<ul style="list-style-type: none"> <li>• Data mining</li> <li>• Analysis</li> <li>• Response preparation</li> <li>• Disposition</li> <li>• Compliance management</li> </ul>
<b>10.2.2 Outbound Correspondence Management</b>	Correspondence Management	<b>Functions include:</b> <ul style="list-style-type: none"> <li>• Ability to capture and manage both electronic and paper outbound communications</li> <li>• Security for confidential correspondence</li> <li>• Workflow scheduling</li> <li>• Classification / categorization</li> <li>• Rules</li> <li>• Metadata creation and management</li> <li>• Search</li> <li>• Tracking</li> <li>• Data mining</li> <li>• Analysis</li> <li>• Response preparation</li> <li>• One-to-one distribution</li> <li>• One-to-many distribution</li> <li>• Disposition</li> <li>• Compliance management</li> </ul>

Chapter 11. Business Management Services	SRM Component group	TARGET
<b>11.1 Management of Process</b>		
<b>11.1.4 Program / Project Management</b>	Program / Project Management	State of Kansas PMM standards
<b>11.1.7 Business Rule Management</b>	Business Rule Management	Security Auditing Rules Engine standards such as JSR-94 Java Rule Engine API
	Risk Management	Kansas PMM standards Security auditing
<b>11.2 Organizational Management</b>		
<b>11.2.1 Workgroup / Groupware</b>	Portals	Shared document capability Channel support Role-based Contextual Seamless Guided Multimedia support Multi-platform access support (desktop, laptop, mobile device, etc.) Interoperability with multiple browsers
	E-mail	Shared Document capability

Chapter 11. Business Management Services	SRM Component group	TARGET
		Interoperability with multiple platforms, operating systems, and/or browsers
	Meeting / Conferencing	<b>Shared Document capability</b> Interoperability with multiple platforms, Operating systems, and/or browsers
	Instant Messaging	<b>Group chat</b> <b>Individual chat</b> Interoperability with multiple platforms, operating systems
<b><u>11.3 Investment Management</u></b>		
<b>11.3.1 Strategic Planning and Management</b>	Financial Modeling and Reporting	<b>Interoperability between disparate Financial systems (XML based)</b> <b>Bloomberg Terminals</b>
<b>11.3.2 Portfolio Management</b>	Financial Portfolio Mgmt	<b>GAAP Compliant</b>
	IT Project Portfolio Mgmt	<b>Components should include:</b> <b>Portfolio and Investment Planning</b> <b>Application Portfolio Mgmt</b> <b>Project Portfolio Mgmt</b> <b>Project and Budget Mgmt</b> <b>Demand Management</b> <b>Resource Management</b> <b>Time Tracking</b> <b>Client Management</b> <b>Performance Management</b> <b>Knowledge Management</b> <b>Financial Management</b> <b>Workflow</b> <b>Reporting</b>
<b>11.3.3 Performance Management</b>	Investment Tracking and Mgmt	<b>GAAP Compliance</b>

Chapter 12. Digital Asset Services	SRM Component group	TARGET
<b><u>12.1 Content Management</u></b>		
<b>12.1.1 Content Authoring</b>	Markup Languages	<b>XML</b>
<b>12.1.2 Content Review and Approval</b>	Version Control and Workflow	<b>Embedded in Content / Document Management System</b>
<b>12.1.3 Tagging and Aggregation</b>	Descriptive Metadata	<b>Dublin Core</b> <b>Domain Specific Schemas / Formats</b> <b>Domain Specific Profiles`</b>
	Semantic Markup	<b>SGML</b> <b>XML</b> <b>Domain Specific Markup Profiles</b>
<b>12.1.4 Content Publishing and Delivery</b>	XML Query Language	<b>XPATH</b>

Chapter 12. Digital Asset Services	SRM Component group	TARGET
	Presentation	CSS XSL
	XML Transformation	XSLT
	Content Syndication	RSS Services Atom Syndication Format
<b>12.2 Document Management</b>		
<b>12.2.1 Document Imaging and OCR</b>	Document Imaging	ANSI/AIIM MS53-1993 AIIM/TR 19-1993 AIIM/TR 29-1993
	OCR	ISO 1073/1-1976 ISO 1073/2-1976 FIPS PUB 32-1 ANSI X3.93M-1981 (R1989) ANSI X3.99-1983 9 (R1991)
<b>12.2.2 Document Referencing</b>	Item Identifiers	Archival Resource Key (ARK) Document Object Identifier (DOI) Handles Namespace Open URL Persistent URL
<b>12.2.3 Document Revisions</b>	Version Control and Workflow	Embedded in Content / Document Management System
<b>12.2.4 Library / Storage</b>	Information Lifecycle Management	Long Term Archive and Compliance Storage Initiative (LTACSI) Standards
<b>12.2.5 Document Review and Approval</b>	Version Control and Workflow	Embedded in Content / Document Management System
<b>12.2.6 Document Conversion</b>	Document Conversion	Avoid Proprietary Formats and Convert to Open Formats

Chapter 13. Business Analytical Services	SRM Component group	TARGET
<b>13.2 Visualization</b>		
<b>13.2.1 Graphing / Charting</b>	Graphing / Charting	Standard Database Linkage (JDBC, ODBC) Integrated drawing tools Multiple graphing / charting types supported (i.e. bar, radar, etc.)
<b>13.2.2 Imagery</b>	Digital Scanning	Scan to PDF Scan to multiple file formats including TIFF, JPEG, JPG2000, ect.
	Microform (microfilm, microfiche)	NISO and ANSI standards including ANSI/NISO Z39.32 – 1996 (R2002) ANSI/NISO Z39.62 – 2000

Chapter 13. Business Analytical Services	SRM Component group	TARGET
		ANSI/NISO Z39.74 – 1996 (R2002)
	Photographs	Multiple ANSI standards covering chemicals, film, processing, ect.
	Digital photographs	Multiple ANSI standards covering pixel-reporting, color-encoding, format profiles, ect.
<b>13.2.4 Mapping / Geospatial / Elevation / GPS</b>	Mapping / Geospatial / Elevation / GPS	Targets are available for this section starting at 4-41
<b>13.4 Business Intelligence</b>		
<b>13.4.3 Decision Support and Planning</b>		Visualization Dashboards
<b>13.5 Reporting</b>		
<b>13.5.1 Ad hoc</b>	Textual and Numeric	Interoperability with multiple data sources SQL query support XML support Ability to script Standard Database Connections (ODBC, JDBC) Web interface using forms Open, Standardized Metadata
<b>13.5.2 Standardized / Canned</b>	Textual and Numeric	Interoperability with multiple data sources SQL query support XML support Ability to script Standard Database Connections (ODBC, JDBC) Web interface using forms Open, Standardized Metadata
<b>13.5.3 OLAP</b>	Textual and Numeric	Interoperability with multiple data sources SQL query support XML support Ability to script Standard Database Connections (ODBC, JDBC) Web interface using forms Open, Standardized Metadata

Chapter 14. Back Office Support	SRM Component group	TARGET
<b>14.1 Data Management</b>		
<b>14.1.3 Data Warehouse</b>	All components	<b>Same as current std</b>
<b>14.1.4 Meta Data Warehouse</b>	All components	<b>Same as current std</b>
<b>14.1.6 Extraction and Transformation</b>	Extraction and Transformation	<b>Integrate with XML. XML Data Interchange (XMI) Integrate with Message Brokers. Standards based metadata Leverage existing code as well as bring new functionality.</b>

Chapter 14. Back Office Support	SRM Component group	TARGET
		<p>Allow for the incorporation of existing working scripts and offer a complete tool set of ready to use transformations and functions as well as a comprehensive list of documented APIs and methods. Improve metadata management and administration as well as ensure data quality.</p> <p>Able to do upfront analysis and modeling and streamline the workflow process.</p>
14.1.7 Loading and Archiving	Methodology	<p>Customized applications and scripts Database import and export tools SQL ODBC, JDBC, OLE XML Automated capture and apply middleware Stored procedures</p>
	Data Loading	<p>Portable Support for</p> <ul style="list-style-type: none"> <li>○ Oracle</li> <li>○ Microsoft SQL Server</li> <li>○ Sybase</li> <li>○ IBM DB2</li> <li>○ flat files</li> <li>○ any JDBC-accessible data source.</li> </ul>
	Application	<p>Logging for:</p> <ul style="list-style-type: none"> <li>• Quality assurance</li> <li>• Audit trail</li> <li>• Error tracing and recovery</li> </ul>
	Technology	<p>Loading solutions built on an open architecture Re-usable custom extensions Open-standard Java-based server engine Platform independence –Minimally must support ODBC and OLE-DB connections. Database using single occurrence of DASD</p>
14.1.8 Data Recovery	Device-based	<p>End-to-end redundancy High fault tolerance SATA FireWire (IEEE-1394)</p>
	Software-based	<p>Automated recovery Point-in-time recovery System-managed storage</p>
	Network-based	NDMP Version 5
14.1.9 Data Classification	General	<p>Criteria:</p> <ul style="list-style-type: none"> <li>○ Confidentiality</li> <li>○ Integrity</li> <li>○ Trustworthiness</li> </ul>

Chapter 14. Back Office Support	SRM Component group	TARGET
		○ Availability
	Information Lifecycle Management	Criteria based on access or availability and recovery requirements, and cost.
	Security	Same as current std
	Subject / Topic	Controlled Taxonomy within organizational units; Controlled Vocabulary Concept Mapping

Chapter 15. Support Services	SRM Component group	TARGET
<b>15.1 Security Management</b>		
15.1.13 Addition Security Areas	Network Security	IPSEC v6
<b>15.2 Collaboration</b>		
15.2.1 E-Mail	Server Side	Cross-platform support Supports IMAP and / or POP protocols Rules support GUI administration interface
	Client Side	<i>Current + Emerging</i>
15.2.3 Document Library	Repository	OAIS standard support for preservation repositories
15.2.4 Shared Calendaring	Access	Supports: <ul style="list-style-type: none"> <li>• Group Access</li> <li>• Multiple User Accounts</li> <li>• Conference Rooms</li> </ul> CalDAV
<b>15.3 Search</b>		
15.3.1 Query	Query	Intelligent Content Services Keyword with Boolean and proximity operators Fielded Search Phrase Search Fuzzy Match
	Query Language	SQL XPointer XPath OQL XQuery
15.3.2 Precision / Recall Ranking	Precision/ Recall Ranking	Boolean operators within query to better define search criteria Natural Language query using Linguistic Analysis Bayesian Probabilistic Model
15.3.3 Classification	Classification schemes	Dewey Decimal System (DDC) Universal Decimal Classification (UDC) Library of Congress Classification System (LCC) Subject-specific schemes such as: <ul style="list-style-type: none"> <li>○ NLM (National Library of Medicine)</li> </ul>

<b>Chapter 15. Support Services</b>	<b>SRM Component group</b>	<b>TARGET</b>
		<ul style="list-style-type: none"> <li>○ Engineering Information (Ei) Classification Codes</li> <li>○ Mathematics Subject Classification</li> </ul> <b>ACM Computing Classification System (CCS)</b>
	Faceted Classification	<b>Subject Domain specific standards</b>
<b>15.3.4 Pattern Matching</b>	Sequence Patterns	<b>Same as current std</b>
	Tree Patterns	<b>Same as current std</b>
<b><u>15.4. Communication</u></b>		
<b>15.4.4 Event / News Management</b>	Management protocols	<b>SNMP V2</b>
<b><u>15.5 Systems Management</u></b>		
<b>15.5.4 Software Distribution</b>	Software and OS deployment	<b>Elevated credential distribution Rollback and version control</b>
<b>15.5.5 Issue Tracking</b>	Software Tools for IT Service Management	<b>Integrated tools – platform independent</b>

## Part 3

# Kansas Technical Reference Model (TRM)

## Kansas Technical Reference Model (TRM) Overview

The TRM is a component-driven, technical framework that categorizes the standards and technologies to support and enable the delivery of Service Components and capabilities. It also unifies existing agency TRMs and E-Gov guidance by providing a foundation to advance the reuse and standardization of technology and Service Components from a government-wide perspective.

Aligning agency capital investments to the TRM leverages a common, standardized vocabulary, allowing interagency discovery, collaboration, and interoperability. Agencies and the state government will benefit from economies of scale by identifying and reusing the best solutions and technologies to support their business functions, mission, and target architecture. The TRM is broken down into the following sections:

### Chapter 5 - Service Access and Delivery

- 5.1 Access Channels  
*Web Browser, Wireless / PDA, Collaboration / Communication, Other Electronic Channels*
- 5.2 Delivery Channels  
*Internet, Intranet, Extranet, Peer to Peer, Virtual Private Network*
- 5.3 Service Requirements  
*Legislative / Compliance, Authentication / Single Sign-On, Hosting*
- 5.4 Service Transport  
*Supporting Network Services, Service Transport*

### Chapter 6 - Service Platform and Infrastructure

- 6.1 Support Platforms  
*Wireless / Mobile, Platform Independent. Platform Dependant*
- 6.2 Delivery Servers  
*Web Servers, Media Servers, Application Servers, Portal Servers*
- 6.3 Software Engineering  
*Integrated Development Environment, Software Configuration Management, Test Management, Modeling*
- 6.4 Databases / Storage  
*Databases, Storage*
- 6.5 Hardware / Infrastructure  
*Servers / Computers, Embedded Technology Devices, Peripherals, Wide Area Network, Local Area Network, Network Devices / Standards, Video Conferencing*

### Chapter 7 - Component Framework

- 7.1 Security  
*Certificates / Digital Signatures. Supporting Security Services*
- 7.2 Presentation / Interface  
*Static Display, Dynamic / Server Side Display, Content Rendering, Wireless / Mobile / Voice*
- 7.3 Business Logic  
*Platform Independent, Platform Dependent*
- 7.4 Data Interchange  
*Data Exchange*
- 7.5 Data Management  
*Database Connectivity, Reporting and Analysis*

### Chapter 8 - Service Interface and Integration

- 8.1 Integration  
*Middleware. Enterprise Application Integration*
- 8.2 Interoperability  
*Data Formats / Classification, Data Types / Validation, Data Transformation*
- 8.3 Interface  
*Service Delivery, Service Description / Interface*

## Chapter 5 Service Access and Delivery

The Service Access and Delivery Service Area defines the collection of Access and Delivery Channels that will be used to leverage the Service Component, and the legislative requirements that govern its use and interaction.

### 5.1 Access Channels

Access Channels define the interface between an application and its users, whether it is a browser, personal digital assistant or other medium.

#### 5.1.1 Web Browser

Define the program that serves as your front end to the World Wide Web on the Internet. In order to view a site, you type its address (URL) into the browser's location field.

Web Browser	Products	Standards
<b>Target</b>	Microsoft Internet Explorer Mozilla Firefox Apple Safari (Mac OS only)	Current + Emerging Standards
<b>Microsoft operating systems are being run on the majority of state owned desktop computers, Microsoft Internet Explorer is the most logical choice for use in state government. Web developers need to be aware that all of the Current and Emerging standards have a large user base and should be used for testing their web based applications to ensure all our customers can receive the same web experience.</b>		
<b>Emerging</b>	Apple Safari Opera	Mobile Web Best Practices (W3C) Voice Browser Semantic Web support Support for W3C technology stack
<b>Current</b>	Mozilla Firefox Microsoft Internet Explorer Google Chrome	W3C standards compliance Support for fundamental features including: <ul style="list-style-type: none"> <li>• Bookmark manager</li> <li>• Content caching</li> <li>• Plug-in support for media-types</li> </ul> Support for "annoyance removal" features including: <ul style="list-style-type: none"> <li>• Pop-up blocker</li> <li>• Advertisement filtering</li> <li>• Controllable Downloads</li> </ul> Supports accessibility for persons with disabilities: <ul style="list-style-type: none"> <li>• W3C Web Accessibility Initiative 2.0</li> <li>• Section 508 support</li> </ul> Security Controls SSL support Active X shutoff Automatic updates for security fixes and new releases Multiple language support for display
<b>Twilight</b>	Netscape	

### 5.1.2 Wireless / PDA

Define the technologies that use transmission via the airwaves. Personal Digital Assistant (PDA) is a handheld computer that serves as an organizer for personal information. It generally includes, at a minimum, a name and address database, to-do list and note taker.

Smart Phones	Products	Standards
Target	Blackberry iPhone	
<b>Blackberry devices still dominate the e-mail centric use case for smart phones. As users demand more web and application needs from smart phones the iPhones and other feature rich smart phone operating systems will gain in usage. Apple iPhones are a current target due to the highest non-Blackberry market penetration of any other smart phone operating systems.</b>		
Emerging	Android-based devices	
Current	Blackberry iPhone Windows Mobile 7 based devices	
Twilight	PDA only devices Palm OS Symbian	

Tablets	Products	Standards
Target	None	
<b>Tablet computing is still an emerging marketplace with substantial installed presence in Kansas and no clear industry leader.</b>		
Emerging	Android-based Tablets	
Current	iPad Windows-based Tablets	
Twilight		

### 5.1.3 Collaboration / Communication

Define the forms of electronic exchange of messages, documents, or other information. Electronic communication provides efficiency through expedited time of delivery.

Electronic Mail	Products	Standards
Target	Microsoft Exchange	
<p><b>Microsoft Exchange is currently being used in the majority of state agencies. Over the last five years agencies have slowly moved away from Lotus Notes and Novell GroupWise. Some agencies are exploring cloud based and open source email solutions. While these options are emerging internally hosted Microsoft Exchange is considered the standard deployment of electronic mail. If agencies are planning a new deployment or upgrade of their electronic mail the use of the centrally hosted DISC electronic mail service should be considered.</b></p>		
Emerging	Google Apps for Domains Microsoft Exchange Online Zimbra Collaboration Suite	
Current	Microsoft Exchange Linux-based Mail Platforms	
Twilight	IBM Lotus Notes Novell GroupWise	

Workflow	Products	Standards
Target	None	
<p><b>The State of Kansas has multiple different workflow solutions running in its infrastructure. As a result, there is no established target. Further study on enterprise requirements should occur and a five-year roadmap should be developed to decrease the number of different workflow solutions running in Kansas.</b></p>		
Emerging	BMC Remedy Service-now.com K2 Blackpearl Custom ASP.NET Web Applications	
Current	Sungard Banner ERP Microsoft SharePoint Oracle PeopleSoft Workflow Engine	
Twilight	IBM Lotus Notes InTempo	

Document Management	Products	Standards
Target	None	
<p>The State of Kansas has multiple different document management solutions running in its infrastructure. As a result, there is no established target. Further study on enterprise requirements should occur and a five-year roadmap should be developed to decrease the number of different document management solutions running in Kansas.</p>		
Emerging		
Current	Perceptive Software ImageNow IBM FileNet Kofax Cature Microsoft SharePoint EMC Documentum Xythos Siebel Oracle IPM	
Twilight	Hyland OnBase IBM iSeries Content Manager Para-Docs Digitech	

Enterprise Service Bus	Products	Standards
Target	None	
<p>The State of Kansas has a very limited installed base for Enterprise Service Bus. KSTARB recognizes this area as a strategic technology area for increased data sharing in Kansas. Further study on enterprise requirements should occur and a five-year roadmap should be developed to implement an enterprise-wide Enterprise Service Bus for Kansas government.</p>		
Emerging		
Current	Microsoft BizTalk Oracle ESB	
Twilight		

Collaboration Environments	Products	Standards
Target	Microsoft SharePoint	
<p>Multiple state agencies have Microsoft SharePoint installed to provide a variety of collaboration services. Further study on enterprise requirements for Microsoft SharePoint should occur and a five-year roadmap should be developed to implements an enterprise-wide Microsoft SharePoint environment.</p>		
Emerging	GoTo Meeting	
Current	Microsoft SharePoint Microsoft Live Meeting Oracle Collaboration Suite Adobe ConnectPro	
Twilight		

### 5.1.4 Other Electronic Channels

Define the other various mediums of information exchange and interface between a user and an application.

Web Services	Products	Standards
Target	None	
<b>Web Services is a standards based topic area with no products.</b>		
Emerging		
Current		W3C standards including: <ul style="list-style-type: none"> <li>• SOAP 1.2 or higher (Simple Object Access Protocol)</li> <li>• WSDL (Web Services Descriptive Language)</li> </ul>
Twilight		

Web Naming and Addressing	Products	Standards
Target	None	
<b>Web Naming and Addressing is a standards based topic area with no products.</b>		
Emerging		
Current		Uniform Resource Name (URN) Uniform Resource Identifier (URI) Uniform Resource Locator (URL)
Twilight		

Web Data Delivery	Products	Standards
Target	None	
<b>Web Data Delivery is a standards based topic area with no products.</b>		
Emerging		
Current		RSS Atom XML
Twilight		

## 5.2 Delivery Channels

Delivery Channels define the level of access to applications and systems based upon the type of network used to deliver them.

### 5.2.1 Internet

The Internet is a worldwide system of computer networks in which users at any one computer can, if they have permission, get information from any other computer.

Web Naming and Addressing	Products	Standards
Target	None	
<b>The Federal Government has a current initiative to move to IPv6. Kansas should follow this implementation closely and determine when it needs to be a transition to IPv6.</b>		
Emerging		Internet Protocol Version 6 (IPv6)
Current		Domain Name Service (DNS) Dynamic Host Control Protocol (DHCP) Internet Protocol (IP)
Twilight		

Internet	Products	Standards
Target	Internet 1 Internet 2	
<b>Connection to Internet 1 is critical for all agencies. Internet 2 access is used by academic institutions for cross-university research.</b>		
Emerging		
Current	Internet 1 Internet 2	IETF standards IANA registry ICANN registry
Twilight		

### 5.2.2 Intranet

An Intranet is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and is used to share company information and resources among employees.

Intranet	Products	Standards
Target	None	
<b>Targets for this area will depend on each agency's web architecture and development platforms, and as a result there is no established target.</b>		
Emerging		Web technology with access controls
Current	Microsoft SharePoint Microsoft Internet Information Server 6.0 uPortal Apache	LAN technology Web technology with access controls Portals merging internal-facing and external-facing content and functions
Twilight		

### 5.2.3 Extranet

Extranet	Products	Standards
Target	None	
<b>Targets for this area will depend on each agency's web architecture and development platforms, and as a result there is no established target.</b>		
Emerging		Web technology with access controls
Current	Microsoft SharePoint Microsoft Internet Information Server 6.0 Apache DotNetNuke	Web technology with access controls Portals merging internal-facing and external-facing content and functions
Twilight		

### 5.2.4 Peer to Peer

Peer to Peer is a class of applications that operate outside the DNS system, have significant or total autonomy from central servers, and take advantage of resources available on the Internet.

Peer to Peer	Products	Standards
Target	None	
<b>There are no products or standards for this area. KTARB determined this was an outdated component of the FEA.</b>		
Emerging		
Current		
Twilight		

### 5.2.5 Virtual Private Network

A private data network that makes use of the public telecommunication infrastructure, maintaining privacy through the use of a tunneling protocol and security procedures.

Virtual Private Networks	Products	Standards
Target	Cisco VPN Cisco GetVPN Netmotion	
<b>Targets were based on the solutions used by most agencies. The use of Cisco solutions also corresponds with heavy use of Cisco products throughout the enterprise.</b>		
Emerging	Microsoft Threat Management Gateway	TLS
Current	Check Point Cisco VPN PPTP Connection Manager SSLVPN Cisco GetVPN Netmotion	IPSEC PPTP L2TP PPP IKE SSL
Twilight	PIX Microsoft ISA	L2F CHAP

Encryption	Products	Standards
Target	None	
<b>Many different encryption solutions are used across Kansas government. Further study should be done to see if the number of different solutions could be decreased.</b>		
Emerging	Microsoft BitLocker	AES-256
Current	PGP Whole Disk Encryption McAfee Endpoint Encryption PKI Digital Certificates Tumbleweed Email Encryption	3DES AES-128
Twilight		DES

Authentication Hashing	Products	Standards
Target	None	
<b>Authentication Hashing is a standards based topic area with no products.</b>		
Emerging		SHA-3
Current		SHA-1 SHA-2
Twilight		MD5

## 5.3 Service Requirements

Service Requirements define the necessary aspects of an application, system or service to include legislative, performance, and hosting.

### 5.3.1 Legislative / Compliance

Defines the prerequisites that an application, system or service must have mandated by congress or governing bodies.

Legislative / Compliance	Products	Standards
Target	None	Section 508 Web Accessibility Standards
<b>There are no products for this area.</b>		
Emerging		
Current		Section 508 Web Accessibility Standards
Twilight		

### 5.3.2 Authentication / Single Sign-On

Refers a method that provides users with the ability to login one time, getting authenticated access to all their applications and resources.

Authentication / Single Sign On	Products	Standards
Target	LDAP Microsoft Active Directory	
<b>The state has a heavy usage of Microsoft Active Directory for employee based Identity Management. LDAP is often used in solutions that cannot take advantage of Microsoft architecture.</b>		
Emerging		
Current	LDAP Microsoft Active Directory	
Twilight	Novel GroupWise	

### 5.3.3 Hosting

Refers to the service provider who manages and provides availability to a web site or application, often bound to a Service Level Agreement (SLA). The Hosting entity generally maintains a server farm with network support, power backup, fault tolerance, load balancing, and storage backup.

Site Selection	Products	Standards
Target		Current and Emerging Standards
<b>Site Selection is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		Less populated areas provide benefit over dense populated areas Non-industrialized areas (especially due to toxicity)
Current		Non-flood plane Non-flight paths Minimal Seismic Activity
Twilight		Office buildings Urban locations

Physical Structure - Exterior	Products	Standards
Target		Current and Emerging Standards
<b>Physical Structure - Exterior is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		Tiers nested or linearly segregated (lowest to highest reliability/security) Exterior bermed above flood plane for security & weather shelter Modular plan for scalable facility
Current		Concrete construction No Exterior Windows Roof Drains Ground Drains Lightning suppression Underground Utilities Electrical Ports on exterior walls for access from outside electricity sources
Twilight		Wooden construction

Physical Structure - Interior		Products	Standards
Target			Current and Emerging Standards
<b>Physical Structure - Interior is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>			
Emerging			DC space free of non-IT equipment (no CRAC units, PDU's, etc.) Mechanical – electrical areas floor below or room beside DC Lower tier modules less costly / reliable / secure. Penetrations for direct liquid immersion cooling planned Penetrations for flexible air source & exhaust planned Penetrations for electrical outlets & expansion planned
Current			Concrete const No Exterior Windows Roof Drains Ground Drains Lightning suppression Underground Utilities Electrical Ports on exterior walls for access from outside electricity sources
Twilight			False Ceilings Floor tile subject to zinc whiskers

Mechanical Systems – Air Condition		Products	Standards
Target			Current and Emerging Standards
<b>Physical Structure - Interior is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>			
Emerging			Overhead supplemental cooling to address heat sensitive areas(waterless) Variable capacity floor-mount cooling Rack centric cooling modules Embedded and on-chip cooling Quick connect locations for cooling cabinets Upper tiers more reliable / secure / costly Flexible cooling air supply & return Direct liquid immersion cooling capable

Mechanical Systems – Air Condition	Products	Standards
Current		Temperature between 68-70 degrees RH between 48-52% Man Traps (Air Locks) Contaminant Controls 18” -36” raised floor High efficiency air filter system Humidity, temp monitoring and control.(with console alerts if possible) Dual loop cooling grid
Twilight		

Mechanical Systems – Air Condition Public Space	Products	Standards
Target		Current and Emerging Standards
<b>Mechanical Systems – Air Condition Public Space is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		High efficiency air filter system Humidity, temp monitoring and control. (when equipment dictates) BACnet controls Individual climate control per cubical (applies to raised floor office environments)
Current		Pressurization less than adjacent data center
Twilight		

Mechanical Systems – Plumbing	Products	Standards
Target		Current and Emerging Standards
<b>Mechanical Systems – Plumbing is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		Smart Monitors for floor drains and sumps (interfaced with multi-purpose building monitoring equipment) BACnet standard integrated building controls for HVAC
Current		Separate plumbing for DC and public areas Avoid overhead water sources Monitors for floor drains and sumps
Twilight		

Mechanical Systems – Fire Suppression		Products	Standards
Target			Current and Emerging Standards
<b>Mechanical Systems – Fire Suppression is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>			
Emerging			In cabinet sensors. Gas Suppression Systems BACnet integrated building controls for fire
Current			Chemical Primary in DC (Dry power or Gas) Dry sprinkler backup in DC Wet sprinkler in public areas Monitoring Systems
Twilight			

Electrical		Products	Standards
Target			Current and Emerging Standards
<b>Electrical is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>			
Emerging			Dual Power Sources A/B power grid in machine space. DC power Modular Power Monitors for power providers Cabinet Monitors Load Banks or load testing agreements Direct Current only in Data Center with all backup power and conditioning in mechanical space
Current			Redundant Generators, UPS, and PDU's where possible Emergency lighting in DC and access hallways Monitoring Systems Twistlock power cords under floor Isolated power feeds from public space
Twilight			

Security – Office Space		Products	Standards
Target			Current and Emerging Standards
<b>Security – Office Space is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>			
Emerging			Biometric identification Integrated security systems BACnet integrated building controls for security

Security – Office Space	Products	Standards
Current		Key locks Card readers Access policy Video Monitoring Patrolled Security
Twilight		

Security – Machine Space	Products	Standards
Target		Current and Emerging Standards
<b>Security – Machine Space is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		Biometric identification Integrated security systems Redundant BACnet integrated building controls for security
Current		Card key access Security clearances Access Policy Video monitoring Security Cabinets Security fencing
Twilight		

Security – Mechanical Space	Products	Standards
Target		Current and Emerging Standards
<b>Security – Mechanical Space is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		Biometric identification Integrated security systems Redundant BACnet integrated building controls for security
Current		Card key access to mechanical rooms, punch down locks, physical key locks Security policy Fenced security for mechanical yard Video Monitoring on interior and exterior space
Twilight		

Security – Building Exterior	Products	Standards
Target		Current and Emerging Standards
<b>Security – Building Exterior Space is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		Truck barriers and/or secured access points at a reasonable safe distance away from facility. Integrated security systems Video monitoring of exterior areas Simple berm with 2' raised walkway
Current		Secured access to roof, air intake systems, and outside doors Security policy Video Monitoring of critical areas
Twilight		

Operational Issues	Products	Standards
Target		Current and Emerging Standards
<b>Operational Issues is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		Proactive monitoring systems with rules based actions (autonomics)
Current		Reduction or elimination of employee workstations within the data center Remote access technologies to reduce human traffic within data center
Twilight		

Data Center Maintenance	Products	Standards
Target		Current and Emerging Standards
<b>Data Center Maintenance is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
Emerging		Lifecycle replacement policies and budgeting Recovery systems and procedures testing
Current		Periodic professional sub floor and duct cleaning, air handler filters, and humidity control systems. Security checks on all maintenance support staff and vendors
Twilight		

Data Center Compliance	Products	Standards
<b>Target</b>		Current and Emerging Standards
<b>Data Center Compliance is a standards based section with no products. Current and Emerging standards are best practices and should considered the targets.</b>		
<b>Emerging</b>		Compliance with industry standards (ISO, IEEE, etc) Pick standards as ISO & IEEE are huge. NEC Article 645 for IT Equipment
<b>Current</b>		HIPPA (Physical security requirements) Professional audits (Ex, security, environmental) AADAG (ADA) access
<b>Twilight</b>		

## 5.4 Service Transport

Service Transport defines the end to end management of the communications session to include the access and delivery protocols.

### 5.4.1 Supporting Network Services

These consist of the protocols that define the format and structure of data and information that is either accessed from a directory or exchanged through communications.

LAN Mail Access	Products	Standards
Target	None	
<b>LAN Mail Access is a standards based topic area with no products.</b>		
Emerging		
Current		MAPI SOAP
Twilight		X.400

Internet Mail Access	Products	Standards
Target	None	
<b>Internet Mail Access is a standards based topic area with no products.</b>		
Emerging		Clientless over HTTPS
Current		Thick Client over IMAP4/S POP3/S
Twilight		

Mail Transport	Products	Standards
Target	None	
<b>Mail Transport is a standards based topic area with no products.</b>		
Emerging		
Current		SMTP ESMTP
Twilight		

Directory Integration	Products	Standards
Target	Microsoft Active Directory	LDAP
<b>Directory Integration is a standards based topic area with no products.</b>		
Emerging		
Current	Microsoft Active Directory	LDAP
Twilight	Novel Directory Service	OID X.500

Automatic Host Configuration	Products	Standards
Target	None	
<b>Automatic Host Configuration is a standards based topic area with no products.</b>		
Emerging		
Current		DHCP
Twilight		BOOTP

Domain Name Resolution	Products	Standards
Target	None	
<b>Domain Name Resolution is a standards based topic area with no products.</b>		
Emerging		
Current		DNS BIND
Twilight		WINS NetBIOS

#### 5.4.2 Service Transport

These consist of the protocols that define the format and structure of data and information that is either accessed from a directory or exchanged through communications.

Internet File Transfer	Products	Standards
Target	CoreFTP Microsoft FTP WSFTP	SFTP
<b>File Transfer targets were chosen based on the most current usage in Kansas government. SFTP should be preferred standard due to the increased security. Agencies should still be careful of sending password in the clear with all FTP protocols.</b>		
Emerging		
Current	CoreFTP Microsoft FTP WSFTP Movelt	FTP SFTP
Twilight		Point To Point

Mail Encoding	Products	Standards
Target	None	
<b>Mail Encoding is a standards based topic area with no products.</b>		
Emerging		S/MIME
Current		MIME
Twilight		

Internet Data	Products	Standards
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Exchange		
Target	None	
Internet Data Exchange is a standards based topic area with no products.		
Emerging		XHTML
Current		HTML EDI XML
Twilight		

VPN Communications	Products	Standards
Target	None	
VPN Communications is a standards based topic area with no products.		
Emerging		
Current		IPSEC PPTP
Twilight		

Formatted File Transmittal	Products	Standards
Target	None	
Formatted File Transmittal is a standards based topic area with no products.		
Emerging		XML
Current		PDF
Twilight		Postscript Image Files

Image Encoding	Products	Standards
Target	None	
Image Encoding is a standards based topic area with no products.		
Emerging		SVG
Current		JPEG PNG TIFF
Twilight		BMP GIF

Mainframe Communication	Products	Standards
Target	None	
Mainframe Communication is a standards based topic area with no products.		
Emerging		
Current		TN3270 Secure TN3270
Twilight		

Terminal Sessions	Products	Standards
Target	None	
Terminal Sessions is a standards based topic area with no products.		
Emerging		
Current		SSH
Twilight		Telnet

HTML Data Transmission	Products	Standards
Target	None	
HTML Data Transmission is a standards based topic area with no products.		
Emerging		
Current		HTTP HTTPS
Twilight		

## Chapter 6 Service Platform and Infrastructure

The Service Platform and Infrastructure Service Area define the collection of platforms, hardware and infrastructure standards that enable Component Based Architectures and Service Component reuse.

### 6.1 Supporting Platforms

Support platforms are hardware or software architectures. The term originally dealt with only hardware, and it is still used to refer to a CPU model or computer family.

#### 6.1.1 Wireless / Mobile

Radio transmission via the airwaves. Various communications techniques are used to provide wireless transmission including infrared "line of sight," cellular, microwave, satellite, packet radio and spread spectrum.

Smart Phones	Products	Standards
Target	Blackberry iPhone	
<b>Blackberry devices still dominate the e-mail centric use case for smart phones. As users demand more web and application needs from smart phones the iPhones and other feature rich smart phone operating systems will gain in usage. Apple iPhones are a current target due to the highest non-Blackberry market penetration of any other smart phone operating systems.</b>		
Emerging	Android-based devices	
Current	Blackberry iPhone Windows Mobile 7 based devices	
Twilight	PDA only devices Palm OS Symbian	

Tablets	Products	Standards
Target	None	
<b>Tablet computing is still an emerging marketplace with substantial installed presence in Kansas and no clear industry leader.</b>		
Emerging	Android-based Tablets	
Current	iPad Windows-based Tablets	
Twilight		

### 6.1.2 Platform Independent

Defines the operating systems and programming languages that are able to execute and run on any platform or operating system. A platform is the underlying hardware and software comprising a system.

Framework	Products	Standards
Target	None	
<b>Framework is a standards based topic area with no products.</b>		
Emerging		
Current		J2EE AJAX W3C WAI-ARIA
Twilight		

Operating System	Products	Standards
Target	Red Hat Enterprise Linux	
<b>Red Hat Enterprise Linux is the most installed Linux distribution on the market. While there are many other Linux distribution that may be viable, Kansas should move forward primarily on one distribution to gain support efficiencies.</b>		
Emerging	Other Linux Distributions	
Current	Red Hat Enterprise Linux	
Twilight	BSD AS/400	

### 6.1.3 Platform Dependant

Defines the operating systems and programming languages that are able to execute and run on a specific platform or operating system. A platform is the underlying hardware and software comprising a system.

Framework	Products	Standards
Target	None	
<b>Framework is a standards based topic area with no products.</b>		
Emerging		
Current		Microsoft .Net
Twilight		

Desktop Operating System	Products	Standards
Target	Windows 7	
<b>Windows 7 is gaining in its installed base. Windows Vista never gained support and should be avoided. Windows XP is becoming unsupported by Microsoft. State of Kansas should begin transitioning to Windows 7.</b>		
Emerging		
Current	Windows 7 Mac OSX Snow Leopard	
Twilight	Windows Vista and earlier Mac OSX Tiger and earlier	

Server Virtualization Platforms	Products	Standards
Target	VMWare	
Both HyperV and VMWare are viable Server Virtualization Platforms. VMWare provides more flexibility since it allows for multiple different operating systems to run on its platform. Agencies that have not begun server virtualization and are interested should contact DISC to provide VM services.		
Emerging		
Current	Microsoft HyperV VMWare	
Twilight		

Mid Tier Server Operating System	Products	Standards
Target	Windows Server 2008 Solaris 10	
Windows Server is the most installed Mid Tier Server Operating system. New Server purchases should use the latest version of Windows Server if possible.		
Emerging		
Current	Windows Server 2008 Windows Server 2003 Solaris 9 and above AIX 5.2 and above	
Twilight	Windows Server 2000 and earlier Novel NetWare Solaris 8 and earlier DEC Alpha OS/400 HPUX	

Mainframe Operating System	Products	Standards
Target	Z/OS	
The State of Kansas has a consolidated mainframe environment running the current version of the Z/OS operating system, as a result it is the de facto target for Mainframe Operating systems		
Emerging		
Current	Z/OS	
Twilight	OS/390 IBM AS400	

## 6.2 Delivery Servers

Delivery Servers are front-end platforms that provide information to a requesting application. It includes the hardware, operating system, server software, and networking protocols.

Note: Hardware and Operating Systems are included in the Platform Independent (6.1.2) and Platform Dependant (6.1.3) sections. Network protocols will be addressed in the Network sections (5.4 and 6.5) of the architecture.

### 6.2.1 Web Servers

A *web server* is a computer that provides World Wide Web services on the Internet. It includes the hardware, operating system, web server software, TCP/IP protocols and the web site content (web pages). If a web server is used internally and not by the public it may be known as an "intranet server."

Web Servers	Products	Standards
<b>Target</b>	Apache (open platform) Microsoft IIS (.Net platform)	
<b>Depending on your development and server infrastructure, Microsoft IIS and Apache are the leaders for traditional web servers. Application specific servers from Oracle, IBM, and Cisco may need to be used for specialized reasons.</b>		
<b>Emerging</b>	Oracle Application Server	
<b>Current</b>	Microsoft IIS Apache IBM Web Sphere Application Server Cisco Media Convergence Server	
<b>Twilight</b>	Other Proprietary Web Servers	

### 6.2.2 Media Servers

Provide optimized management of media based files such as audio and video streams and digital images. Comprises the content delivery service environment for streaming live or on demand video and audio content.

Media Servers	Products	Standards
<b>Target</b>	None	
<b>There is not enough agency installed base of Media Servers to determine a target for this section.</b>		
<b>Emerging</b>		
<b>Current</b>	Windows Media Server Apple QuickTime Server Helix Media Delivery System	
<b>Twilight</b>		

Media Players	Products	Standards
Target	None	
<b>Media player target will depend on the type of media and the agency architecture thus there is not target established for this area.</b>		
Emerging		
Current	Windows Media Player Apple iTunes VLC Media Player	
Twilight		

### 6.2.3 Application Servers

In a three tier environment, a separate computer (application server) performs the business logic, although some part may still be handled by the user's machine. After the web exploded in the mid 1990s, application servers became web-based.

Application Servers	Products	Standards
Target	None	
<b>Web Servers and Application servers can be seen as almost identical. As a result, the products and standards in 6.2.1 should be used for Application Servers also.</b>		
Emerging		
Current		
Twilight		

### 6.2.4 Portal Servers

Portals represent focus points for interaction, providing integration and single source corporate information.

Portal Servers	Products	Standards
Target	Microsoft SharePoint	
<b>Microsoft SharePoint has grown in popularity in the last five years. The latest release of SharePoint is the most feature rich offering, and had many installations in state agencies. Further study on enterprise requirements for Microsoft SharePoint should occur and a five-year roadmap should be developed to implements an enterprise-wide Microsoft SharePoint environment.</b>		
Emerging		
Current	uPortal Microsoft SharePoint IBM WebSphere DotNetNuke Oracle Fusion Middleware	
Twilight		

## 6.3 Software Engineering

Software engineering covers the technology associated with building software systems as well as technical solutions supporting management issues, such as testing, modeling and versioning. The TRM is concerned with component technical architecture, not engineering processes.

### 6.3.1 Integrated Development Environment

This consists of the hardware, software and technology that facilitate the development of software applications and systems.

Integrated Development Environments	Products	Standards
<b>Target</b>	None	
<b>There are not established targets for IDE's as they are dependent on agency platform and developer preference. Products listed below give list of possible IDE's.</b>		
<b>Emerging</b>		
<b>Current</b>	Eclipse IDE JBoss AS Rational Application Developer NetBeans JBuilder JDeveloper Microsoft Visual Studio .Net Oracle PeopleTools Microsoft Team Foundation Server TSO / Roscoe	
<b>Twilight</b>	Advantage GEN Software AG Cold Fusion	

Common IDE Components	Products	Standards
<b>Target</b>		Source code editor Compiler or interpreter Build-automation tools Debugger
<b>When choosing an IDE, agencies should consider the following list of standards as default requirements.</b>		
<b>Emerging</b>		Integrated version control GUI construction tools Class browser Object inspector Class hierarchy diagram
<b>Current</b>		Source code editor Compiler or interpreter Build-automation tools Debugger
<b>Twilight</b>		

Programming Paradigm	Products	Standards
Target		Service Oriented Architecture
<b>While Object Oriented programming will remain a current standard for the foreseeable future, more large IT development is happening in Service Oriented Architectures. The benefits of re-use and modularity, and the trend of more cross-agency IT projects makes using SOA an attractive programming paradigm.</b>		
Emerging		
Current		Object Oriented Architecture Service Oriented Architecture
Twilight		Structured

Requirements	Products	Standards
Target		XML Capable Support development of Web-based environments Interoperability with multiple environments Code transparency Support Plug-ins
<b>When choosing an IDE, agencies should consider the following list of standards as default requirements.</b>		
Emerging		Smart Client Development
Current		XML Capable Support development of Web-based environments Interoperability with multiple environments Code transparency Support Plug-ins
Twilight		Text Based

Security	Products	Standards
Target		Single Sign-on with controlled permissions LDAP X.500 Support
<b>When choosing an IDE, agencies should consider the following list of standards as default requirements.</b>		
Emerging		Single Sign-on with controlled permissions
Current		LDAP X.500 Support
Twilight		

### 6.3.2 Software Configuration Management

Technology applicable to all aspects of software development from design to delivery specifically focused on the control of all work products and artifacts generated during the development process. Several technical solutions on the market provide the integration of the software configuration management functions.

Version Management	Products	Standards
<b>Target</b>		Ability to recover from previous versions Ability to distinguish different versions Ability to roll back to previous version Multiple checkouts with automated synchronization Auditable Release Control
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	CA Librarian Apache Subversion ClearCase Microsoft Team Foundation Server	Ability to recover from previous versions Ability to distinguish different versions Ability to roll back to previous version Multiple checkouts with automated synchronization Auditable Release Control
<b>Twilight</b>	In-House Developed Solution CVS CA Fusion / Harvest Source Safe	Manual Process

Issue Tracking	Products	Standards
<b>Target</b>		Task Assignment Task Tracking Assign Ownership Metrics Reporting capabilities
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	Bugzilla BMC Remedy ClearQuest Service-Now Numara TrackIT Microsoft Team Foundation Server LANDesk Service Desk Microsoft SharePoint Magic HelpDesk BaseCamp	Task Assignment Task Tracking Assign Ownership Metrics Reporting capabilities

Issue Tracking	Products	Standards
Twilight	IBM Infoman HEAT Microsoft Office	

Defect Tracking	Products	Standards
Target		Ability to identify, assign and manage defects Ability to track defects Ability to capture bugs Ability to report Metrics
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
Emerging		
Current	BMC Remedy Microsoft Team Foundation Server Bugtracker	Ability to identify, assign and manage defects Ability to track defects Ability to capture bugs Ability to report Metrics
Twilight		

Task Management	Products	Standards
Target		Ability to define tasks Ability to prioritize
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
Emerging	Wikis	
Current	Microsoft Team Foundation Server Microsoft Project Basecamp BugTracker Microsoft Office	Ability to define tasks Ability to prioritize
Twilight		

Change Management	Products	Standards
Target		ITIL process compliant
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
Emerging	Service-Now	
Current	Numara Footprints BMC Remedy ClearCase LANDesk ServiceDesk	ITIL process compliant
Twilight		Manual process or No process In-house developed

Deployment Management	Products	Standards
Target		Auto deployment and tracking (Push or Pull)
There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.		
Emerging	BuildForge	Virtual Auto Deployment
Current	Maven Ant Microsoft Team Foundations Server LANDesk Desktop Management Suite Oracle PeopleTools Hudson Autosys Phire	Auto deployment and tracking (Push or Pull)
Twilight		

Requirements Management	Products	Standards
Target		None
There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.		
Emerging		Automation with manual processes Tie requirements to functionality and to test cases
Current	Requisite Pro Microsoft Office	No process or Manual process
Twilight		

### 6.3.3 Test Management

Technology which supports the consolidation of all testing activities and results. Test Management activities include test planning, designing (test cases), execution, reporting, code coverage, and heuristic and harness development.

Test Management	Products	Standards
Target		Create reproducible test scripts. Create reliable, reusable, reproducible test data sets Tests tracked to make sure all of the code is tested Easily generated load testing Documented scripts
There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.		
Emerging	Redmine	

Test Management	Products	Standards
<b>Current</b>	Microsoft Team Foundation Server Oracle Automated Testing Suite JUnit JMeter OpenLoad Hudson LoadRunner phpUnit TestComplete 7	Create reproducible test scripts. Create reliable, reusable, reproducible test data sets Tests tracked to make sure all of the code is tested Easily generated load testing Documented scripts
<b>Twilight</b>		Manual Process

Functional Testing	Products	Standards
<b>Target</b>		
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
<b>Emerging</b>	Redmine	
<b>Current</b>	Microsoft Office Microsoft Visual Studio Microsoft Project Bugzilla	Scripting Data Sets
<b>Twilight</b>		Manual Process

Business Cycle Testing	Products	Standards
<b>Target</b>		
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	Microsoft Office Microsoft Project SortSite	
<b>Twilight</b>		

Usability Testing	Products	Standards
<b>Target</b>		Ability to test W3C compliance Ability to test for State requirements Ability to test for Federal requirements (section 508, ect)
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	Bobby JAWS HiSoft Sheriff	Ability to test W3C compliance Ability to test for State requirements Ability to test for Federal requirements

		(section 508, ect)
<b>Twilight</b>		

<b>Performance Profiling</b>	<b>Products</b>	<b>Standards</b>
<b>Target</b>		
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	FreezeFrame OpenLoad Perfmon	Scripting Data Sets
<b>Twilight</b>		Manual Process

<b>Load / Stress / Volume Testing</b>	<b>Products</b>	<b>Standards</b>
<b>Target</b>		
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
<b>Emerging</b>	MacroSoft WCAT	
<b>Current</b>	CompuWare QA Load JMeter OpenLoad Microsoft Web Stress Tool Microsoft Visual Studio Apache Benchmark HP LoadRunner TestComplete 7	Scripting Data Sets
<b>Twilight</b>		Manual Process

<b>Security and Access Control Testing</b>	<b>Products</b>	<b>Standards</b>
<b>Target</b>		
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	Oracle Grid Control HP LoadRunner Microsoft Visual Studio	
<b>Twilight</b>		

Reliability Testing	Products	Standards
Target		
There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.		
Emerging		
Current	Oracle Grid Control Microsoft Visual Studio	Scripting Data Sets
Twilight		Manual Process

Configuration Testing	Products	Standards
Target		
There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.		
Emerging		
Current	Oracle Grid Control Microsoft Visual Studio	
Twilight		

Installation Testing	Products	Standards
Target		
There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.		
Emerging		
Current	Oracle Grid Control Microsoft Visual Studio	
Twilight		

Unit Testing	Products	Standards
Target		Built-in Unit Testing
There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.		
Emerging		
Current	JUnit Microsoft Visual Studio phpUnit TestComplete 7 Cactus Canoe RDz	Built-in Unit Testing
Twilight		

Simulation Testing	Products	Standards
Target		Developer tested code
<b>There are no defined Product targets in this area as they are often determined by the programming environment. As IT consolidation strategies develop in coming years, moving towards a more common set of development tools should be considered.</b>		
Emerging		Automated simulation testing
Current	TestComplete 7 Microsoft Visual Studio	Developer tested code
Twilight		

### 6.3.4 Modeling

Technology that supports the process of representing entities, data, business logic, and capabilities for aiding in software engineering.

Modeling	Products	Standards
Target	Metastorm ProVison Microsoft Visio	Tools that support UML Ability to link models Interoperable with other model programs Ability to recreate reusable models
<b>Metastorm's ProVison software is the modeling tool used by most state Enterprise Architects. For lightweight modeling, Microsoft Visio is a relatively common product that can serve the use of most typical modeling needs.</b>		
Emerging		
Current	Metastorm ProVison Microsoft Visio IBM System Architect Alfabet CA ERWin Triox	Tools that support UML Ability to link models Interoperable with other model programs Ability to recreate reusable models
Twilight		Manual Process

## 6.4 Database / Storage

Database / Storage refers to a collection of programs that enables storage, modification, and extraction of information from a database, and various techniques and devices for storing large amounts of data.

### 6.4.1 Database

Refers to a collection of information organized in such a way that a computer program can quickly select desired pieces of data. A database management system (DBMS) is a software application providing management, administration, performance, and analysis tools for databases.

Server Database	Products	Standards
<b>Target</b>	Oracle Microsoft SQL Server mySQL	Relational Spatial XML
<b>Databases will often be dependent on the platform of the application. Oracle and Microsoft have the most installed base, but mySQL is growing in popularity in lower cost application deployments. The proper selection of databases will depends on the requirements of the application.</b>		
<b>Emerging</b>		Object-Oriented CORBA
<b>Current</b>	DB2 Oracle Microsoft SQL Server mySQL IBM UniVerse PostgreSQL	Relational Spatial XML
<b>Twilight</b>	Sybase SAS Adabas Paradox SQL Anywhere FoxPro	Flat File

Client Database	Products	Standards
<b>Target</b>		
<b>There are no targets for client databases as they are primarily used for testing and reporting purposes and their selection will depend heavily and agency and user preference. Client Databases should not be used for citizen-facing applications.</b>		
<b>Emerging</b>		
<b>Current</b>	DB2 Light Oracle Light Microsoft Access mySQL Open Office DB	
<b>Twilight</b>	Paradox SAS PostgreSQL Sybase FoxPro	

## 6.4.2 Storage

Storage devices are designed to provide information to direct attached servers or provide non-volatile digital storage media to support information processing in a local and a network environment. These devices provide extended storage capabilities to the network with reduced costs compared to traditional file servers.

Note: The State of Kansas has chosen to limit this area to only Storage. Databases are covered within the Database section (6.4.1) of the architecture.

Tape	Products	Standards
<b>Target</b>		
<b>There is currently no target for storage technology since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b>		
<b>Emerging</b>	EMC DL-210 Disk Library	LTO 5 Virtual Tape
<b>Current</b>	EMC Avamar Disk Space DLT Backup	LTO 4
<b>Twilight</b>		LTO 3 or older

Disks	Products	Standards
<b>Target</b>		
<b>There is currently no target for storage technology since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	Xiotech Magnitude 4000 EMC Cx480 Dell Equallogic Dell DPM Microsoft DPM	SCSI Solid State SATA Fiber Channel
<b>Twilight</b>	Xiotech Magnitude 3000	IDE EIDE MFM ESDI

Optical	Products	Standards
<b>Target</b>	None	
<b>Optical media is a commodity. CD, DVD, and BluRay writeable discs should be purchased at the lowest cost based on requirements of the agency.</b>		
<b>Emerging</b>		
<b>Current</b>		
<b>Twilight</b>		

Storage Systems	Products	Standards
<b>Target</b>		
<p><b>There is currently no target for storage technology since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b></p>		
<b>Emerging</b>		
<b>Current</b>	Xiotech SAN SUN Disk Arrays Netapp FAS3070 EMC Clarion SAN EMC Centera PS5500E iSCSI SAN HP EVA 5000 Fiber Chanel SAN HP P4300	Local RAID SAN iSCSI
<b>Twilight</b>		NAS

SAN Switches	Products	Standards
<b>Target</b>		
<p><b>There is currently no target for storage technology since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b></p>		
<b>Emerging</b>		
<b>Current</b>	Dell McData Brocade Cisco HP	Inter-VSAN routing
<b>Twilight</b>		

Fiber Connections	Products	Standards
<b>Target</b>		
<p><b>There is currently no target for storage technology since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b></p>		
<b>Emerging</b>		
<b>Current</b>	Cisco Switches	LC ST
<b>Twilight</b>		SC

SAN Management	Products	Standards
<b>Target</b>		
<p style="text-align: center;"><b>There is currently no target for storage technology since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b></p>		
<b>Emerging</b>		
<b>Current</b>	<p style="text-align: center;">TekTools EMC Management Tools Icon Manager ECM Navisphere Xiotech Internal Management Dell SAN HQ Tivoli Storage Manager HP Lefthand</p>	
<b>Twilight</b>		

## 6.5 Hardware / Infrastructure

Defines the physical devices, facilities and standards that provide the computing and networking within and between enterprises.

### 6.5.1 Servers / Computers

This refers to the various types of programmable machines which are capable of responding to sets of instructions and executing programs.

Note: Detail information for programmable machines is addressed within the Platform Independent/Dependant (6.1.2 and 6.1.3) sections.

### 6.5.2 Embedded Technology Devices

This refers to the various devices and parts that make up a Server or Computer as well as devices that perform specific functionality outside of a Server or Computer.

Note: Detail information for Embedded Technology Devices is addressed within the Support Platform (6.1) and Database/Storage (6.4) sections.

### 6.5.3 Peripherals

A **peripheral** is a type of computer hardware that is added to a host computer in order to expand its abilities. More specifically the term is used to describe those devices that are optional in nature, as opposed to hardware that is either demanded, or always required in principle.

Printers	Products	Standards
Target	None	
Printers are considered a commodity product. There is little differentiation between competitors. Agencies should leverage state contracts to get the best possible price for printers that meet agency requirements.		
Emerging		
Current		
Twilight		

Scanners	Products	Standards
Target	None	
Scanners are considered a commodity product. There is little differentiation between competitors. Agencies should leverage state contracts to get the best possible price for printers that meet agency requirements.		
Emerging		
Current		
Twilight		

### 6.5.4 Wide Area Networks

A data network typically extending a LAN outside a building or beyond a campus is known as a WAN. This is typically created by using circuits and routers to connect geographically separated LANs. The Internet is a WAN consisting of many interconnected private WANs and LANs.

Media - Fiber	Products	Standards
Target	Cisco Dense Wavelength Division Multiplexing (DWDM)	
<b>Dense Wavelength Division Multiplexing is used on the KANWIN network, as a result it is considered the de facto target for state WANs. Specific products are not listed due to security concerns.</b>		
Emerging		
Current	Cisco Dense Wavelength Division Multiplexing (DWDM) ONS Appliances	Multi-mode Single-mode
Twilight		

Wireless Point to Point	Products	Standards
Target	Aruba	
<b>Aruba access points are used in the state deployment of wireless networks. As a result it is considered the de facto target for wireless point-to-point solutions. Specific products are not listed due to security concerns.</b>		
Emerging		
Current	Aruba Cisco Wireless Enterasys / Siemens	
Twilight		

Multiplexing	Products	Standards
Target		DWDM
<b>Dense Wavelength Division Multiplexing is used on the KANWIN network, as a result it is considered the de facto target for state WANs. Specific products are not listed due to security concerns.</b>		
Emerging		
Current	Cisco ONS Lambda CWD ADC DS3 Ciena OC3	DWDM
Twilight		

OSI Layer 2	Products	Standards
Target	Cisco Switches	
Cisco switches are used on the KANWIN network, as a result it is considered the de facto target for Kansas. Specific products are not listed due to security concerns.		
Emerging	Extreme Networks	
Current	Cisco Switches 3COM	SONET Ethernet
Twilight		FDDI Frame Relay ATM

OSI Layer 3	Products	Standards
Target	Cisco Routers	
Cisco switches are used on the KANWIN network, as a result it is considered the de facto target for Kansas. Specific products are not listed due to security concerns.		
Emerging		Internet Protocol v6
Current	Cisco Routers Enterasys	Internet Protocol v4 MPLS Multicast
Twilight		HDLC SDLC Bisyngh SNA X.25

Routing Protocol	Products	Standards
Target	Cisco Routers	
Cisco switches are used on the KANWIN network, as a result it is considered the de facto target for Kansas. Specific products are not listed due to security concerns.		
Emerging		MBGP IS-IS
Current	Cisco Routers Enterasys	BGPv4 MPLS OSPF
Twilight		RIP

Quality of Service	Products	Standards
Target		
QoS is emerging as an important standard with unified communications. KTARB should continue to monitor this area and update the KITA when QoS becomes more prevalent in the network.		
Emerging		
Current		DiffServ (over provisioning)
Twilight		

### 6.5.5 Local Area Networks

A network that interconnects devices over a geographically small area, typically in one building or a part of a building.

Media Installation	Products	Standards
Target		
<b>Any new copper runs should use the current highest standard to allow for future growth on the wire.</b>		
Emerging		
Current		EAI/ITA 568-B
Twilight		

Media - Copper	Products	Standards
Target		Category 6E
<b>Any new copper runs should use the current highest standard to allow for future growth on the wire.</b>		
Emerging		Category 6E
Current		Category 5 Category 5E
Twilight		Coax Twinax Category 3

Media - Fiber	Products	Standards
Target		
<b>Any new fiber runs should use the current highest standard to allow for future growth on the wire.</b>		
Emerging		
Current		Single Mode Multi Mode
Twilight		

Wireless	Products	Standards
Target		
<b>Aruba access points are used in the state deployment of wireless networks. As a result it is considered the de facto target for wireless point-to-point solutions. Specific products are not listed due to security concerns.</b>		
Emerging		WiMAX
Current	Aruba Access Points Cisco Access Points Free Radius Steel Belted Radius	IEEE 802.11 a, b, g, n
Twilight		Vendor Proprietary

Topology	Products	Standards
Target		
<b>Framework is a standards based topic area with no products.</b>		
Emerging		
Current		Star Mesh Point-To-Point
Twilight		Bus Ring

OSI Layer 1	Products	Standards
Target		
<b>Agencies need to consider their speed requirements when determining Layer 1 materials. Refer to industry best practices when choosing media type.</b>		
Emerging		10GB BaseT Ethernet
Current		100BaseT Ethernet 1000BaseT Ethernet
Twilight		Repeaters Concentrators Hubs 10Base2 and 10BaseT Ethernet

OSI Layer 2	Products	Standards
Target	Cisco Switches	
<b>Cisco switches are used on the KANWIN network, as a result it is considered the de facto target for Kansas. Specific products are not listed due to security concerns.</b>		
Emerging		
Current	Cisco Switches 3COM Enterasys	IEEE 802.1-3 Ethernet Ethernet Switches VLANs (IEEE 802.1q)
Twilight		Bridges Token Ring NetBEUI NetBIOS

OSI Layer 3	Products	Standards
Target	Cisco Routers	
<b>Cisco switches are used on the KANWIN network, as a result it is considered the de facto target for Kansas. Specific products are not listed due to security concerns.</b>		
Emerging		Internet Protocol v6
Current	Cisco Routers Enterasys	Internet Protocol v4 SIP
Twilight	Netgear Router/Firewall	DECnet Appletalk IPX/SPX

Quality of Service	Products	Standards
Target		
QoS is emerging as an important standard with unified communications. KTARB should continue to monitor this area and update the KITA when QoS becomes more prevalent in the network.		
Emerging		IEEE 802.3q
Current		
Twilight		

### 6.5.6 Network Devices / Standards

A group of stations (computers, telephones, or other devices) connected by communications facilities for exchanging information. Connection can be permanent, via cable, or temporary, through telephone or other communications links. The transmission medium can be physical (i.e. fiber optic cable) or wireless (i.e. satellite).

OSI Layer 1	Products	Standards
Target		
Emerging		10GB BaseT Ethernet
Current		100BaseT Ethernet 1000BaseT Ethernet
Twilight		Repeaters Concentrators Hubs 10Base2 and 10BaseT Ethernet

OSI Layer 2	Products	Standards
Target	Cisco Switches	
Cisco switches are used on the KANWIN network, as a result it is considered the de facto target for Kansas. Specific products are not listed due to security concerns.		
Emerging		
Current	Cisco Switches 3COM Enterasys	IEEE 802.1-3 Ethernet Ethernet Switches VLANS (IEEE 802.1q)
Twilight		Bridges Token Ring NetBEUI NetBIOS

OSI Layer 3	Products	Standards
<b>Target</b>	Cisco Routers	
<b>Cisco switches are used on the KANWIN network, as a result it is considered the de facto target for Kansas. Specific products are not listed due to security concerns.</b>		
<b>Emerging</b>		Internet Protocol v6
<b>Current</b>	Cisco Routers Enterasys	Internet Protocol v4 SIP
<b>Twilight</b>	Netgear Router/Firewall	DECnet Appletalk IPX/SPX

### 6.5.7 Video Conferencing

Communication across long distances with video and audio contact that may also include graphics and data exchange. Digital video transmission systems typically consist of camera, codec (coder decoder), network access equipment, network, and audio system.

Telephone video	Products	Standards
<b>Target</b>	Cisco 9971 Video Phone	Session Initiated Protocol
<b>DISC's Voice Over IP solution is the telephony target for the state. As a result, the recommended and targeted phone for telephone-based video is the Cisco 9971.</b>		
<b>Emerging</b>		
<b>Current</b>	Cisco 9971 Video Phone	Session Initiated Protocol
<b>Twilight</b>		

Desktop Video	Products	Standards
<b>Target</b>	Microsoft Lync Cisco CUPC	Any Cameras Compatible with products listed
<b>Microsoft and Cisco both have attractive solutions for Desktop video. It will depend on agency preference and requirements to determine which one is the preferred solution.</b>		
<b>Emerging</b>	Microsoft Lync	
<b>Current</b>	Cisco CUPC	
<b>Twilight</b>	Microsoft OCS	

Dedicated Conferencing Solutions	Products	Standards
<b>Target</b>	Polycom Hardware Cisco Hardware	Compatibility with Cisco Call Manager SIP Compatible
<b>There is a large Polycom installed base in Kansas. Agencies with new deployments of Polycom should make sure the new hardware is compatible for the Cisco Call Manager and VOIP solution DISC is providing to ensure all features will be available to the agency in the enterprise system.</b>		
<b>Emerging</b>	Cisco Webex	
<b>Current</b>	Microsoft LiveMeeting Polycom Cisco/Tanberg	H.323
<b>Twilight</b>		

Immersed Telepresence	Products	Standards
<b>Target</b>	Cisco Telepresence	Session Initiated Protocol
<b>Kansas has the capabilities for telepresence. All telepresence should leverage the Cisco VOIP infrastructure.</b>		
<b>Emerging</b>		
<b>Current</b>	Cisco Telepresence	Session Initiated Protocol
<b>Twilight</b>		

## Chapter 7 Component Framework

The Component Framework Service Area defines the underlying foundation and technical elements by which Service Components are built, integrated and deployed across Component-Based and Distributed Architectures. The Component Framework consists of the design of application or system software that incorporates interfaces for interacting with other programs and for future flexibility and expandability. This includes, but is not limited to, modules that are designed to interoperate with each other at runtime. Components can be large or small, written by different programmers using different development environments and may be platform independent. Components can be executed on standalone machines, a LAN, Intranet or the Internet.

### 7.1 Security

Security defines the methods of protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide integrity, confidentiality and availability.

#### 7.1.1 Certificates / Digital Signatures

Software used by a certification authority (CA) to issue digital certificates and secure access to information. The evolution of Public Key Infrastructure (PKI) is based on the verification and authentication of the parties involved in information exchange.

Certificates / Digital Signatures	Products	Standards
Target	State of Kansas PKI / Verisign	FIPS 140
<b>The Kansas Uniform Electronic Transaction Act stipulates that all digital signatures used to do business by the state use the Kansas PKI. As a result, digital signature standards are the target for Kansas. Electronic signatures are not subject to this law.</b>		
Emerging		
Current	State of Kansas PKI / Verisign	FIPS 140
Twilight		

Electronic Signatures	Products	Standards
Target	State of Kansas PKI / Verisign	FIPS 140
<b>The Kansas Uniform Electronic Transaction Act stipulates that all digital signatures used to do business by the state use the Kansas PKI. As a result, digital signature standards are the target for Kansas. Electronic signatures are not subject to this law, but PKI should still be considered as a first alternative for Electronic Signature deployment.</b>		
Emerging		
Current	State of Kansas PKI / Verisign Microsoft Certificate Authority Services Network Solutions Security Services PGP	FIPS 140
Twilight		

### 7.1.2 Supporting Security Devices

Firewalls	Products	Standards
Target		
<p>There is currently no target for firewalls since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current	Cisco Firewalls Microsoft Forefront CheckPoint Firewalls SonicWall Firewalls	
Twilight		

Virtual Private Networks	Products	Standards
Target		
<p>There is currently no target for VPNs since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current	Cisco ASA Microsoft ISA NetMotion Checkpoint VPN Sonicwall VPN	
Twilight	Cisco VPN VPNet VPN	

Intrusion Detection Systems	Products	Standards
Target		
<p>There is currently no target for IDS since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current	Cisco ASA Symantec Tripwire	
Twilight	Cisco AIP-SSM ISS RealSecure	

Intrusion Protection Systems	Products	Standards
Target		
There is currently no target for IPS since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.		
Emerging		
Current	CheckPoint ISA Cisco ASA IPS ISS Proventia Microsoft TMG	
Twilight	ISS RealSecure Server	

Wireless	Products	Standards
Target		
There is currently no target for wireless security since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.		
Emerging		
Current	Included in Access Points	
Twilight		

Virus Management	Products	Standards
Target		
There is currently no target for virus management since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.		
Emerging		
Current	Trend Micro Suite Cisco Ironport Microsoft Forefront Symantec Suite	
Twilight		

Authentication and Authorization	Products	Standards
Target		
There is currently no target for authentication and authroization since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.		
Emerging		
Current	Kansas PKI / Verisign RSA SecurID Microsoft Active Directory	
Twilight	Novel IDM	

Encryption	Products	Standards
Target		
There is currently no target for encryption since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.		
Emerging		
Current	State of Kansas PKI / Verisign PGP Windows BitLocker McAfee Endpoint Encryption F5 Firepass Tumbleweed	
Twilight		

Hard Authentication	Products	Standards
Target		
There is currently no target for hard authentication since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.		
Emerging		
Current	State of Kansas PKI RSA SecureID Aladin E-Tokens	
Twilight		

Vulnerability Scanners	Products	Standards
Target		
There is currently no target for vulnerability scanners since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.		
Emerging		
Current	Nessus MBSA Qualys Ncircle VDN Eeye/Sourcefire ISS Internet Scanner	
Twilight		

Patch Management	Products	Standards
Target		
<p>There is currently no target for patch management since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current	Microsoft Systems Center	
Twilight	Microsoft SMS	

Monitoring, Auditing, Log Analysis	Products	Standards
Target		
<p>There is currently no target since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current		
Twilight		

Workstation Policy Assurance	Products	Standards
Target		
<p>There is currently no target since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current		
Twilight		

Spam Management	Products	Standards
Target		
<p>There is currently no target since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current		
Twilight		

Web Filtering	Products	Standards
Target		
<p>There is currently no target since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current		
Twilight		

Secure Email	Products	Standards
Target		
<p>There is currently no target since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current		
Twilight		

System Health and Status	Products	Standards
Target		
<p>There is currently no target since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</p>		
Emerging		
Current		
Twilight		

## 7.2 Presentation / Interface

This defines the connection between the user and the software, consisting of the presentation that is physically represented on the screen.

### 7.2.1 Static Display

This consists of the software protocols that are used to create a predefined, unchanging graphical interface between the user and the software.

Static Display	Products	Standards
<b>Target</b>		
<b>There is currently no target for static display since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	SortSite Adobe Dreamweaver Microsoft Visual Studio	HTML W3C Standards ITEC Policy 1210 SGML
<b>Twilight</b>	Text Editors	

### 7.2.2 Dynamic / Server Side Display

This consists of the software that is used to create graphical user interfaces with the ability to change while the program is running.

Dynamic / Sever Side Display	Products	Standards
<b>Target</b>		
<b>There is currently no target for Server Side Display since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b>		
<b>Emerging</b>		
<b>Current</b>	Adobe Dreamweaver Microsoft Visual Studio	ASP.NET JSP ASP PHP
<b>Twilight</b>	Text Editors	

### 7.2.3 Content Rendering

This defines the software and protocols used for transforming data for presentation in a graphical user interface.

Content Rendering	Products	Standards
<b>Target</b>		
<p><b>There is currently no target for content rendering since there are so many unique agency deployments of these technologies. As IT consolidation strategies develop in coming years, moving towards a more common set of storage devices should be considered.</b></p>		
<b>Emerging</b>		
<b>Current</b>	Adobe Dreamweaver Microsoft Visual Studio	DHTML XHTML CSS XSLT Javascript W3C Standards ITEC Policy 1210
<b>Twilight</b>		

### 7.2.4 Wireless / Mobile / Voice

This consists of the software and protocols used for wireless and voice enabled presentation devices.

Mobile Device Presentation	Products	Standards
<b>Target</b>	Microsoft Lync Cisco VOIP	
<p><b>Cisco's voice offering which is delivered by DISC is the defacto target for Kansas. There will be some utilization of Microsoft Lync technologies in highly Microsoft based agencies. Lync should only be used when Cisco VOIP cannot be utilized.</b></p>		
<b>Emerging</b>	Skype	XHTMLMP VXML
<b>Current</b>	Microsoft Lync Cisco VOIP	WML
<b>Twilight</b>	Microsoft OCS	

## 7.3 Business Logic

Defines the software, protocol or method in which business rules are enforced within applications.

### 7.3.1 Platform Independent

Consists of all software languages that are able to execute and run on any type of operating system or platform

Platform Independent	Products	Standards
Target		
Emerging		WSRP
Current		Cobol Java Enterprise Edition Java Standard Edition Java Servlet Java Beans Javascript RAD Perl PHP Python C, C++ RDz
Twilight		SAS

### 7.3.2 Platform Dependant

Consists of the programming languages and methods for developing software on a specific operating system or platform.

Mainframe	Products	Standards
Target		
Emerging		
Current	3270 Client	AS400 RPG Natural
Twilight	Fortran Assembler	

Windows	Products	Standards
Target		
Emerging		
Current	Microsoft Visual Studio	C# ASP.NET Visual Basic.NET VB Script
Twilight		

Other	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	PeopleSoft PeopleTools	
<b>Twilight</b>		

## 7.4 Data Interchange

Define the methods in which data is transferred and represented in and between software applications.

### 7.4.1 Data Exchange

Data Exchange is concerned with the sending of data over a communications network and the definition of data communicated from one application to another. Data Exchange provides the communications common denominator between disparate systems.

Open Protocols for Databases	Products	Standards
Target		Open Database Connectivity (ODBC) Java Database Connectivity (JDBC)
Emerging		
Current	SPSS Microsoft Access Attunity Oracle SQL.NET	Open Database Connectivity (ODBC) Java Database Connectivity (JDBC)
Twilight		

Transport Method	Products	Standards
Target		FTP Batch Web Services SMTP Portal Services
Emerging		
Current	Microsoft Exchange .NET Nuke Microsoft SharePoint uPortal	FTP Batch Web Services SMTP Portal Services
Twilight		

Definitions of Data	Products	Standards
Target		National Information Exchange Model Schemas
Emerging		
Current		National Information Exchange Model Schemas XML Schemas EDI
Twilight		

Messaging Template	Products	Standards
Target		
Emerging		
Current		Data Exchange Templates
Twilight		

Data Exchange Architecture	Products	Standards
Target		National Information Exchange Model
Emerging		
Current		Data Synchronization Exchanges Data Publishing Exchanges National Information Exchange Model
Twilight		

Error Handling and Failure Recovery	Products	Standards
Target		
Emerging		
Current		
Twilight		

Authentication	Products	Standards
Target		
Emerging		
Current		
Twilight		

Verification	Products	Standards
Target		
Emerging		
Current		
Twilight		

## 7.5 Data Management

Data management is the management of all data/information in an organization. It includes data administration, the standards for defining data and the way in which people perceive and use it.

### 7.5.1 Database Connectivity

Defines the protocol or method in which an application connects to a data store or database.

Proprietary Protocols	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>		Active Data Objects (ADO) Active Data Objects .Net (ADO.Net) Object Linking and Embedding/Database (OLE/DB) Data Access Objects (DAO) DB2 Connect
<b>Twilight</b>		

Open Protocols	Products	Standards
<b>Target</b>		Java Database Connectivity (JDBC) Open Database Connectivity (ODBC)
<b>Emerging</b>		
<b>Current</b>		Java Database Connectivity (JDBC) Open Database Connectivity (ODBC)
<b>Twilight</b>		

### 7.5.2 Reporting and Analysis

Consist of the tools, languages and protocols used to extract data from a data store and process it into useful information.

System Architecture	Products	Standards
<b>Target</b>		Service Oriented Architecture <ul style="list-style-type: none"> <li>• XML</li> <li>• SOAP</li> <li>• WSDL</li> </ul> WSRP
<b>Emerging</b>		
<b>Current</b>		Service Oriented Architecture <ul style="list-style-type: none"> <li>• XML</li> <li>• SOAP</li> <li>• WSDL</li> <li>• WSRP</li> </ul>
<b>Twilight</b>		Thick Client

<b>Enterprise Business Intelligence</b>	<b>Products</b>	<b>Standards</b>
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	Cognos BI Business Objects	
<b>Twilight</b>		

<b>Data Structure Support</b>	<b>Products</b>	<b>Standards</b>
<b>Target</b>		Relational Databases Online Analytical Processing ROLAP MOLAP Java Online Analytical Processing
<b>Emerging</b>		
<b>Current</b>		Relational Databases Online Analytical Processing ROLAP MOLAP Java Online Analytical Processing
<b>Twilight</b>		Hierarchical Databases

<b>Data Integration and Export Format</b>	<b>Products</b>	<b>Standards</b>
<b>Target</b>		XML XBRL
<b>Emerging</b>		Extensible Business Reporting Language XML for Analysis
<b>Current</b>	Adobe Acrobat Microsoft Excell Open Office	XML PDF
<b>Twilight</b>		Flat Files

## Chapter 8 Service Interface and Integration

The Service Interface and Integration Service Area defines the discovery, interaction and communication technologies joining disparate systems and information providers. SOAs leverage and incorporate Service Interface and Integration standards to provide interoperability and scalability.

### 8.1 Integration

Integration defines the software services enabling elements of distributed business applications to interoperate. These elements can share function, content, and communications across heterogeneous computing environments. In particular, service integration offers a set of architecture services such as platform and service location transparency, transaction management, basic messaging between two points, and guaranteed message delivery.

#### 8.1.1 Middleware

Middleware increases the flexibility, interoperability, and portability of existing infrastructure by linking or “gluing” two otherwise separate applications.

Enterprise Service Bus	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	Microsoft BizTalk Oracle ESB	
<b>Twilight</b>		

Security	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	Shibboleth CAS	
<b>Twilight</b>		

Web Based	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	IBM WebSphere Oracle Application Server Microsoft Application Server	XML SOAP Web Services SOA HATS
<b>Twilight</b>	ARC IMS	

Message Oriented	Products	Standards
<b>Target</b>		
<b>Message Oriented Middleware products are plentiful in Kansas. As a result, there is no target. Over the next 5 years, the</b>		
<b>Emerging</b>		
<b>Current</b>	IBM WebShere MQ Microsoft Message Queue Java Message Service ActiveMQ iPush Server Oracle Advance Queuing SonicMD Tuxedo PeopleSoft Campus KBI / KCJIs Message Switch	
<b>Twilight</b>		

Remote Call Procedures	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>		RPC Java RMI
<b>Twilight</b>		

Database Access Engine	Products	Standards
<b>Target</b>		
<b>Database Access Middleware is highly dependent on your database backend. As a result, there is no target.</b>		
<b>Emerging</b>		
<b>Current</b>	SQLServer Enterprise Manager Mainframe Adapters for vsam and adabas Oracle ETL Tools SSIS	SQL PL TOAD
<b>Twilight</b>	Net8	

Transaction Process Monitors	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	TMON Tuxedo Tmax	
<b>Twilight</b>		

Object Request Broker	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>		Interface Description Language (IDL) CORBA COM DCOM COM+
<b>Twilight</b>		

### 8.1.2 Enterprise Application Integration

Refers to the processes and tools specializing in updating and consolidating applications and data within an enterprise. EAI focuses on leveraging existing legacy applications and data sources so that enterprises can add and migrate to current technologies.

Querying	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	Oracle Search Engine Microsoft SharePoint Google Search Appliance	Z39.50 SRW/SRU
<b>Twilight</b>		

Data Harvesting	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	SAS Microsoft SharePoint EDS Cognos BI SPSS	OAI-PMH
<b>Twilight</b>		

Transforming and Formatting	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	SAS Oracle ETL SSIS Microsoft BizTalk Oracle ESB	MPEG 21 XSLT ETL
<b>Twilight</b>		

Business Process Management	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>		BPM BPEL
<b>Twilight</b>		

## 8.2 Interoperability

Interoperability defines the capabilities of discovering and sharing data and services across disparate systems and vendors.

The service areas below are defined in terms of **data** while the above definition of Interoperability includes discovery and sharing of **services**. One comprehensive method of discovery and sharing of services is Universal Description, Discovery and Integration (UDDI). This protocol is one of the major building blocks required for successful Web services. UDDI creates a standard interoperable platform that enables companies and applications to quickly, easily, and dynamically find and use Web services over the Internet. UDDI also allows operational registries to be maintained for different purposes in different contexts. UDDI is a cross-industry effort driven by major platform and software providers, as well as marketplace operators and e-business leaders within the OASIS standards consortium. <http://www.uddi.org/>.

The UDDI project takes advantage of World Wide Web Consortium (W3C) and Internet Engineering Task Force (IETF) standards such as Extensible Markup Language (XML), and HTTP and Domain Name System (DNS) protocols. UDDI uses Web Services Description Language (WSDL) to describe the services. WSDL is an XML-based language used to describe the services a business offers and to provide a way for individuals and other businesses to access those services electronically. WSDL is the cornerstone of the Universal Description, Discovery, and Integration (UDDI) initiative spearheaded by Microsoft, IBM, and Ariba. UDDI is an XML-based registry for businesses worldwide, which enables businesses to list themselves and their services on the Internet. WSDL is the language used to do this. WSDL is derived from Microsoft's Simple Object Access Protocol (SOAP) and IBM's Network Accessible Service Specification Language (NASSL). WSDL replaces both NASSL and SOAP as the means of expressing business.

Additionally, cross platform programming features are addressed by adopting early versions of the proposed Simple Object Access Protocol (SOAP) known as XML Protocol messaging specifications found at the [W3C Web site](#). The UDDI protocol is the building block that will enable businesses to quickly, easily and dynamically find and transact with one another using their preferred applications.

UDDI.org has released the UDDI Version 3 specification. UDDI Version 3 builds on the vision of UDDI: a "meta service" for locating web services by enabling robust queries against rich metadata. Learn more about UDDI Version 3 by reading the [UDDI Version 3 Features List](#).

Specifications and Standards for UDDI can be found at <http://www.soaprpc.com/specifications.html>; and for WSDL [http://searchwebservices.techtarget.com/sDefinition/0,,sid26\\_qci521683,00.html](http://searchwebservices.techtarget.com/sDefinition/0,,sid26_qci521683,00.html).

### 8.2.1 Data Format / Classification

Defines the structure of a file. There are hundreds of formats, and every application has many different variations (database, word processing, graphics, executable program, etc.). Each format defines its own layout of the data. The file format for text is the simplest.

Text	Products	Standards
<b>Target</b>	Microsoft Word	Assessable to individuals with disabilities
<b>Microsoft Office suite's installed base is substantially greater than any other document editing program. Users are most comfortable and productive using it.</b>		
<b>Emerging</b>	Google Apps for Government Microsoft Office Azure	
<b>Current</b>	Microsoft Word Adobe Acrobat OpenOffice Apple iWork Pages	PDF/A XML (includes XSD/XSL/XHTML, etc.; with included or accessible schema and character encoding explicitly specified) Assessable to individuals with disabilities
<b>Twilight</b>		

Raster Image	Products	Standards
<b>Target</b>	Adobe Photoshop ESRI ARC Editor	
<b>For traditional graphic design, Adobe Photoshop is the market leader. GIMP is well used in the open source environment, but Kansas has little desktop Linux installations. Other less powerful graphic design tools can be used for more lightweight needs.</b>		
<b>Emerging</b>		
<b>Current</b>	Adobe Photoshop GIMP Microsoft Paint Open Office Draw ESRI ARC Editor	
<b>Twilight</b>	Paint Shop Pro	

Vector Graphics	Products	Standards
<b>Target</b>	Microsoft Visio ESRI ARC Editor	
<b>Microsoft Visio is the most used tool for vector graphics and charting.</b>		
<b>Emerging</b>		
<b>Current</b>	Microsoft Visio Adobe Illustrator Open Office Draw ESRI ARC Editor	
<b>Twilight</b>		

Spreadsheets	Products	Standards
<b>Target</b>	Microsoft Excel	
<b>Microsoft Office suite's installed base is substantially greater than any other spreadsheet program. Users are most comfortable and productive using it.</b>		
<b>Emerging</b>	Google Apps for Government Microsoft Office Azure	
<b>Current</b>	Microsoft Excel OpenOffice Calc Apple iWork Numbers	
<b>Twilight</b>	IBM Lotus Quattro Pro	

Desktop Databases	Products	Standards
<b>Target</b>	Microsoft Access	
<b>Microsoft Office suite's installed base is substantially greater than any other desktop database program. Users are most comfortable and productive using it. More sophisticated users may need to use other programs.</b>		
<b>Emerging</b>		
<b>Current</b>	Microsoft Access mySQL Open Office Base SQL Management Studio	
<b>Twilight</b>	Fox Pro File Maker Pro Paradocs	

Presentation	Products	Standards
<b>Target</b>	Microsoft PowerPoint	
<b>Microsoft Office suite's installed base is substantially greater than any other presentation program. Users are most comfortable and productive using it. More sophisticated users may need to use other programs.</b>		
<b>Emerging</b>	Google Apps for Government Microsoft Office Azure	
<b>Current</b>	Microsoft PowerPoint OpenOffice Impress Apple iWork Keynote	
<b>Twilight</b>		

### 8.2.2 Data Types / Validation

Refers to standards used in identifying and affirming common structures and processing rules. This technique is referenced and abstracted from the content document or source data.

XML Data Types	Products	Standards
<b>Target</b>		
<b>Emerging</b>	XML Notepad XML Spy PrimalScript	
<b>Current</b>		Primitive Derived
<b>Twilight</b>		

Database	Products	Standards
<b>Target</b>		
<b>Database Products are listed in Chapter Six</b>		
<b>Emerging</b>		
<b>Current</b>		Exact Numerics Approximate Numerics Date and Time Character Strings Unicode Character Strings Binary Strings Other Data Types
<b>Twilight</b>		

Validation	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>		XML Schemas applied against appropriate standardized profiles
<b>Twilight</b>		

### 8.2.3 Data Transformation

Data Transformation consists of the protocols and languages that change the presentation of data within a graphical user interface or application.

Data Transformation	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>		XSL (XSLT, XPath, XSL FO) OpenGIS
<b>Twilight</b>		

## 8.3 Interface

Interface defines the capabilities of communicating, transporting and exchanging information through a common dialog or method. Delivery Channels provide the information to reach the intended destination, whereas Interfaces allow the interaction to occur based on a predetermined framework.

### 8.3.1 Service Discovery

#### Service Discovery

Defines the method in which applications, systems or web services are registered and discovered.

Service Discovery	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>	Oracle UDDI Service Registry Engine Microsoft UDDI Registry IBM WebSphere	UDDI Z39.50 SRW/SRU
<b>Twilight</b>		

### 8.3.2 Service Description / Interface

Defines the method for publishing the way in which web services or applications can be used.

Service Discovery	Products	Standards
<b>Target</b>		
<b>Emerging</b>		
<b>Current</b>		WSDL API – Service Specific XML Gateways
<b>Twilight</b>		

## Part 4

# Kansas Service Component Reference Model (SRM)

## Kansas Service Component Reference Model Overview

The SRM is a business-driven, functional framework classifying Service Components according to how they support business and performance objectives. It serves to identify and classify horizontal and vertical Service Components supporting federal agencies and their IT investments and assets. The model aids in recommending service capabilities to support the reuse of business components and services across the federal government.

The SRM is organized across horizontal service areas, independent of the business functions, providing a leverageable foundation for reuse of applications, application capabilities, components, and business services.

Chapter 9 - Customer Service	
<ul style="list-style-type: none"> <li>● 9.1 Customer Relationship Management <i>Call Center Management, Customer Analytics, Sales and Marketing, Product Management, Brand Management, Customer / Account Management, Customer Feedback, Surveys</i></li> </ul>	<ul style="list-style-type: none"> <li>● 9.2 Customer Preferences <i>Personalization, Subscriptions, Alerts and Notifications</i></li> <li>● 9.3 Customer Initiated Assistance <i>Online Help, Online Tutorials, Self-Service, Reservations / Registration, Multi-Lingual Support, Assistance Request, Scheduling</i></li> </ul>
Chapter 10 - Process Automation	
<ul style="list-style-type: none"> <li>● 10.1 Tracking and Workflow <i>Process Tracking, Case Management, Conflict Resolution</i></li> </ul>	<ul style="list-style-type: none"> <li>● 10.2 Routing and Scheduling <i>Inbound Correspondence Management, Outbound Correspondence Management</i></li> </ul>
Chapter 11 - Business Management Services	
<ul style="list-style-type: none"> <li>● 11.1 Management of Process <i>Change Management, Configuration Management, Requirements Management, Program / Project Management, Quality Management, Business Rule Management, Risk Management</i></li> <li>● 11.2 Organization Management <i>Workgroup / Groupware, Network Management</i></li> </ul>	<ul style="list-style-type: none"> <li>● 11.3 Investment Management <i>Strategic Planning and Management, Portfolio Management, Performance Management</i></li> <li>● Supply Chain Management <i>Procurement, Sourcing Management, Inventory Management, Catalog Management, Ordering / Purchasing, Invoice / Requisition Tracking and Approval, Storefront / Shopping Cart, Warehouse Management, Returns Management, Logistics and Transportation</i></li> </ul>
Chapter 12 - Digital Asset Services	
<ul style="list-style-type: none"> <li>● 12.1 Content Management <i>Content Authoring, Content Review and Approval, Tagging and Aggregation, Content Publishing and Delivery, Syndication Management</i></li> <li>● 12.2 Document Management <i>Document Imaging and OCR, Document Referencing, Document Revisions, Library / Storage, document Review and Approval, Document Conversion, Indexing, Classification</i></li> </ul>	<ul style="list-style-type: none"> <li>● 12.3 Knowledge Management <i>Information Retrieval, Information Mapping / Taxonomy, Information Sharing, Categorization, Knowledge Engineering, Knowledge Capture, Knowledge Distribution and Delivery, Smart Documents</i></li> <li>● 12.4 Records Management <i>Records Linking / Association, Document Classification, Document Retirement, Digital Rights Management</i></li> </ul>

### Chapter 13 - Business Analytical Services

- 13.1 Analysis and Statistics  
*Mathematical, Structural / Thermal, Radiological, Forensics*
- 13.2 Visualization  
*Graphing / Charting, Imagery, Multimedia, Mapping / Geospatial / Elevation / GPS, CAD*
- 13.3 Knowledge Discovery  
*Data Mining, Modeling, Simulation*
- 13.4 Business Intelligence  
*Demand Forecasting / Management, Balanced Scorecard, Decision Support and Planning*
- 13.5 Reporting  
*Ad Hoc, Standardized / Canned, OLAP*

### Chapter 14 - Back Office Support

- 14.1 Data Management  
*Data Exchange, Data Mart, Data Warehouse, Meta Data Management, Data Cleansing, Extraction and Transformation, Loading and Archiving, Data Recovery, Data Classification*
- 14.2 Assets / Materials Management  
*Computes / Automation Management*
- 14.3 Development and Integration  
*Legacy Integration, Enterprise Application Integration, Data Integration, Instrumentation and Testing, Software Development*
- Human Resources  
*Recruiting, Resume Management, Career Development and Retention, Time Reporting, Awards Management, Benefit Management, Retirement Management, Personnel Administration, Education / Training, Health and Safety, Travel Management*
- Financial Management  
*Billing and Accounting, Credit / Charge, Expense Management, Payroll, Payment / Settlement, Debt Collection, Revenue Management, Internal Controls, Auditing, Activity Based Management, Currency Translation*
- Human Capital / Workforce Management  
*Resource Planning and Allocation, Skills Management, Workforce Directory / Locator, Team / Org Management, Contingent Workforce Management, Workforce Acquisition / Optimization*

### Chapter 15 - Support Services

- 15.1 Security Management  
*Identification and Authentication, Access Control, Encryption, Intrusion Detection, Verification, Digital Signatures, User Management, Role / Privilege Management, Audit Trail and Capture, Forensics, Incident Response, Risk Management*
- 15.2 Collaboration  
*Email, Threaded Discussions, Document Library, Shared Calendaring, Task Management*
- 15.3 Search  
*Query, Precision / Recall Ranking, classification, Pattern Matching*
- 15.4 Communication  
*Real Time Chat / Instant Messaging, Audio Conferencing, Video Conferencing, Event / News Management, Community Management, computer Telephony Integration, Voice Communications*
- 15.5 Systems Management  
*License Management, Remote Systems Control, System Resource Monitoring, Software Distribution, Issue Tracking*
- 15.6 Forms Management  
*Forms Creation, Forms Modification*

## Chapter 9 Customer Services

The Customer Services Domain defines the set of capabilities that are directly related to an internal or external customer, the business's interaction with the customer, and the customer driven activities or functions. The Customer Services Domain represents those capabilities and services that are at the front end of a business and interface at varying levels with the customer.

### 9.1 Customer Relationship Management

Capabilities within this Service Type are used to plan, schedule, and control the activities between the customer and the enterprise, both before and after a product or service is offered.

#### 9.1.1 Call Center Management

Handle telephone sales and/or service to the end customer

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Service Desk and Incident Management and Resolution</b>	Bendata HEAT Support Magic Home grown tools Peregrine Service Center	BMC Remedy BMC Magic HP OpenView HP Service Center FRS HEAT CA Unicenter Track-It (Small organizations)	Axios (ITIL based) Service Now Newmera Footprints	<b>Integrated automated hardware, application, and network management tools to proactively alert service desk staff to potential problems</b>
<b>Change Management</b>	Manual Processes Peregrine Service Center CA- Endeavor	BMC Magic		
<b>Problem Management</b>	Manual Processes	Manual Processes		

### 9.1.2 Customer Analytics

Allow for the analysis of an organization's customers, as well as the scoring of third-party information as it relates to an organization's customers

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Customer Analytics		Crystal Reports 9.0		

### 9.1.3 Sales and Marketing

Facilitate the promotion of a product or service and capture of new business

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Sales and Marketing				

### 9.1.4 Product Management

Facilitate the creation and maintenance of products and services

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Service Catalog		Web-based list		

### 9.1.5 Brand Management

Support the application of a trade name to a product or service as well as developing an awareness for the name

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Brand Management				

### 9.1.6 Customer / Account Management

Support the retention and delivery of a service or product to an organization's clients

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Customer Relationship Management (CRM)				

### 9.1.7 Contact and Profile Management

Provide a comprehensive view of all customer interactions, including calls, email, correspondence and meetings; also provides for the maintenance of a customer's account, business and personal information

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Customer Relationship Management (CRM)				

### 9.1.8 Partner Relationship Management

Provide a framework to promote the effective collaboration between an organization and its business partners, particularly members of the distribution chain (e.g., channel and alliance partners, resellers, agents, brokers, and dealers) and other third parties that support operations and service delivery to an organization's customers; includes performance evaluation of partners, if necessary

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Partner Relationship Management				

### 9.1.9 Customer Feedback

Is used to collect, analyze and handle comments and feedback from an organization's customers

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Customer Feedback				

### 9.1.10 Surveys

Are used to collect useful information from an organization's customers.

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Assessment tools		Survey Monkey	TechQual	

## 9.2 Customer Preferences

Capabilities within this Service Type allow an organization's customers to change a user interface and the way that data is displayed.

### 9.2.1 Personalization

Change a user interface and how data is displayed

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Portal – personalization</b>		uPortal Kansas.gov portal Kansas.gov content management system	Microsoft SharePoint MySites	

### 9.2.2 Subscriptions

Allow a customer to join a forum, listserv, or mailing list

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Listserv</b>		Listproc Majordomo		
<b>Subscription feed services</b>		RSS		

### 9.2.3 Alerts and Notifications

Allow a customer to be contacted in relation to a subscription or service of interest

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Alerts and Notifications</b>		Emergency Notification Systems		

## 9.3 Customer Initiated Assistance

Capabilities within this Service Type allow customers to proactively seek assistance and service from an organization.

### 9.3.1 Online Help

Provide an electronic interface to customer assistance

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Online Help</b>		Web ITEC Policy 1210		

### 9.3.2 Online Tutorials

Provide an electronic interface to educate and assist customers

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Online Tutorials</b>		Web ITEC Policy 1210		

### 9.3.3 Self-Service

Allow an organization's customers to sign up for a particular service at their own initiative

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Self-Service</b>		Web forms ITEC Policy 1210		

### 9.3.4 Reservations / Registration

Allow electronic enrollment and confirmations for services

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Reservations / Registration</b>		In-house registration system		

### 9.3.5 Multi-Lingual Support

Allow access to data and information in multiple languages

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Multi-Lingual Support</b>				

### 9.3.6 Assistance Request

Support the solicitation of support from a customer

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Assistance Request				

### 9.3.7 Scheduling

Define the set of capabilities that support the plan for performing work or service to meet the needs of an organization's customers

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Project management		MS Project Manager		

## Chapter 10 Process Automation

The Process Automation Services Domain defines the set of capabilities that support the automation of process and management activities that assist in effectively managing the business. The Process Automation Services domain represents those services and capabilities that serve to automate and facilitate the processes associated with tracking, monitoring, and maintaining liaison throughout the business cycle of an organization.

### 10.1 Tracking and Workflow

Capabilities within this Service Type provide automatic monitoring and routing of documents to the users responsible for working on them to support each step of the business cycle.

#### 10.1.1 Process Tracking

Allow the monitoring of activities within the business cycle

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Access</b>		Supports both Internal and External Access		Supports both Internal and External Access
<b>Workflow</b>		Process definition and mapping  Routing  Event triggers based on time, date, process completion, etc.  Group assignments  Individual assignments  Status reporting  Can be tailored to domain-specific processes such as telecommunications management, service desk event management, document processing, personnel hiring, interlibrary loan requests, etc.		Process definition and mapping  Routing  Event triggers based on time, date, process completion, etc.  Group assignments  Individual assignments  Status reporting  Can be tailored to domain-specific processes such as telecommunications management, service desk event management, document processing, personnel hiring, interlibrary loan requests, etc.
<b>Security</b>		Usage of X.509 electronic / digital signatures or certificates  Auditing capabilities		Usage of X.509 electronic / digital signatures or certificates  Auditing capabilities

Processing		Parallel processing		Parallel processing
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Description	Example Products	Notes
Process Tracking	<ul style="list-style-type: none"> <li>• Ad-hoc Workflow</li> <li>• FormSoft Forms Warehouse</li> <li>• ImageNow</li> <li>• PeopleAdmin</li> <li>• BMC Remedy</li> <li>• ACE*Comm</li> <li>• Webtrieve</li> <li>• OCLC Interlibrary Loan system</li> <li>• RAPID ILL system</li> </ul>	Twilight Technology

### 10.1.2 Case Management

Manage the life cycle of a particular claim or investigation within an organization to include creating, routing, tracing, assignment and closing of a case as well as collaboration among case handlers

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Case Management		Data and communications protocol interoperability for inter-agency communications within the State, within the region, or nationally (i.e. communication with federal agencies)		Data and communications protocol interoperability for inter-agency communications within the State, within the region, or nationally (i.e. communication with federal agencies)

Description	Example Products	Notes
Case Management	Specific Line-of-Business applications	Examples include law enforcement, corrections, social services, hospitals / medical centers, immigration, revenue, etc.

### 10.1.3 Conflict Resolution

Support the conclusion of contention or differences within the business cycle

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
		Manual Accounting and Budget Processes		
<b>Business Rules</b>		Rules composition Rules deployment Run-time engine Component process and terminology definition <ul style="list-style-type: none"> <li>○ Matching</li> <li>○ Conflict resolution</li> <li>○ Action</li> </ul> Rule set tracking Policy testing tools Authorization Domain-specific business rules languages	Rule Interchange Format	Rules composition Rules deployment Run-time engine Component process and terminology definition <ul style="list-style-type: none"> <li>○ Matching</li> <li>○ Conflict resolution</li> <li>○ Action</li> </ul> Rule set tracking Policy testing tools Authorization Rule Interchange Format

## 10.2 Routing and Scheduling

Capabilities within this Service Type provide automatic directing, assignment, or allocation of time for a particular action or event.

### 10.2.1 Inbound Correspondence Management

Manage externally initiated communication between an organization and its stakeholders.

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Correspondence Management</b>		Ability to capture and manage both electronic and paper inbound communications  Security for confidential correspondence  Workflow scheduling  Classification / categorization  Rules  Metadata creation and management  Search  Tracking  Data mining  Analysis  Response preparation  Disposition  Compliance management		Ability to capture and manage both electronic and paper inbound communications  Security for confidential correspondence  Workflow scheduling  Classification / categorization  Rules  Metadata creation and management  Search  Tracking  Data mining  Analysis  Response preparation  Disposition  Compliance management

## 10.2.2 Outbound Correspondence Management

Manage internally initiated communication between an organization and its stakeholders

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Correspondence Management</b>		Ability to capture and manage both electronic and paper outbound communications  Security for confidential correspondence  Workflow scheduling  Classification / categorization  Rules  Metadata creation and management  Search  Tracking  Data mining  Analysis  Response preparation  One-to-one distribution  One-to-many distribution  Disposition  Compliance management		Ability to capture and manage both electronic and paper outbound communications  Security for confidential correspondence  Workflow scheduling  Classification / categorization  Rules  Metadata creation and management  Search  Tracking  Data mining  Analysis  Response preparation  One-to-one distribution  One-to-many distribution  Disposition  Compliance management

## Chapter 11 Business Management Services

The Business Management Services Domain defines the set of capabilities that support the management of business functions and organizational activities that maintain continuity across the business and value-chain participants. The Business Management Services Domain represents those capabilities and services that are necessary for projects, programs and planning within a business operation to successfully be managed.

### 11.1 Management of Process

Capabilities within this Service Type regulate the activities surrounding the business cycle of an organization.

#### 11.1.1 Change Management

Control the process for updates or modifications to the existing documents, software or business processes of an organization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Document Management		Microsoft SharePoint	ITIL CMDB BMC Remedy	

#### 11.1.2 Configuration Management

Control the hardware and software environments, as well as documents of an organization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
			ITIL Configuration Management	

#### 11.1.3 Requirements Management

Gather, analyze and fulfill the needs and prerequisites of an organization's efforts

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Requirements Management		Manual Process	ITIL Process Management	

#### 11.1.4 Program / Project Management

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Program / Project Management		Manual Process State of Kansas PMM standards	ITIL Process Management Version Three Project Portfolio Management	State of Kansas PMM standards

### 11.1.5 Governance / Policy Management

Influence and determine decisions, actions, business rules and other matters within an organization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Governance / Policy Management</b>		Manual Process	ITIL Process Management DOD 5015 Workflow Systems (such as those in BMC Remedy or AceComm)	
<b>Rules</b>		Manual Process		
<b>Environment</b>		Dynamic Policy  Microsoft SharePoint  Document Management Systems		

### 11.1.6 Quality Management

Help determine the level that a product or service satisfies certain requirements

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Quality Management</b>		Manual Process  Assessment Measurements  LIBqual	ITIL Processes  RLG/NARA Audit Checklist for Certifying Digital Repositories  TECHqual	

### 11.1.7 Business Rule Management

Manage the enterprise processes that support an organization and its policies

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Business Rule Management</b>		ISO 27000 Security Standards  Security Auditing  Rules Engine standards such as JSR-94 Java Rule Engine API		Security Auditing  Rules Engine standards such as JSR-94 Java Rule Engine API

### 11.1.8 Risk Management

Support the identification and probabilities or chances of hazards as they relate to a task, decision or long-term goal

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Risk Management</b>		Kansas PMM standards		Kansas PMM standards
		Security auditing		Security auditing
		ISO 27000 security standard		

## 11.2 Organizational Management

Capabilities within this Service Type support both collaboration and communication within an organization.

### 11.2.1 Workgroup / Groupware

Support multiple users working on related tasks

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Portals</b>		Shared document capability  Channel support  Role-based  Contextual  Seamless  Guided  Multimedia support Multi-platform access support (desktop, laptop, mobile device, etc.)  ITEC Policy 1210 Compliance  Interoperability with multiple browsers		Shared document capability  Channel support  Role-based  Contextual  Seamless  Guided  Multimedia support  Multi-platform access support (desktop, laptop, mobile device, etc.)  ITEC Policy 1210 Compliance  Interoperability with multiple browsers
<b>E-mail</b>		Shared Document capability  Interoperability with multiple platforms, operating systems, and/or browsers		Shared Document capability  Interoperability with multiple platforms, operating systems, and/or browsers
<b>Meeting / Conferencing</b>		Shared Document capability  Interoperability with multiple platforms, Operating systems, and/or browsers		Shared Document capability  Interoperability with multiple platforms, Operating systems, and/or browsers

<b>Instant Messaging</b>		Group chat  Individual chat  Interoperability with multiple platforms, operating systems		Group chat  Individual chat  Interoperability with multiple platforms, operating systems
<b>Blog (Weblog) platforms</b>		Authoring  Editing  Linking  Web syndication  Ability to publish to the web  Multi-language support  Ability for other users to post comments  ITEC Policy 1210 Compliance	Photo-blogging  Video-blogging	
<b>Wiki platforms</b>		Authoring  Editing  Linking  Web syndication  Ability to publish to the web  Multi-language support  Ability for group editing and commenting  ITEC Policy 1210 Compliance		

Description	Example Products	Notes
<b>Portals</b>	<ul style="list-style-type: none"> <li>• uPortal</li> <li>• Sharepoint</li> <li>• Xythos</li> </ul>	
<b>Blog (Weblog) Platforms</b>	<ul style="list-style-type: none"> <li>• Drupal</li> <li>• Roller</li> <li>• Six Apart – Movable Type</li> <li>• Six Apart – TypePad</li> <li>• Telligent Systems</li> <li>• Traction Software</li> <li>• UserLand Software</li> <li>• WordPress</li> <li>• iUpload</li> </ul>	
<b>Instant Messaging</b>	<ul style="list-style-type: none"> <li>• Jabber</li> <li>• AOL</li> <li>• Yahoo!</li> <li>• Microsoft</li> <li>• Integrated domain-specific products such as OCLC's Questionpoint (library application)</li> </ul>	
<b>Wiki platforms</b>	<ul style="list-style-type: none"> <li>• Twiki</li> <li>• Minerva</li> <li>• TikiWiki</li> <li>• Zwiki</li> </ul>	
<b>Email</b>	See Collaboration section	

### 11.2.2 Network Management

Monitor and maintain a communications network in order to diagnose problems, gather statistics and provide general usage.

## 11.3 Investment Management

Capabilities within this Service Type manage the financial assets and capital of an organization.

### 11.3.1 Strategic Planning and Management

Support the determination of long-term goals and the identification of the best approach for achieving those goals

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Financial Modeling and Reporting</b>		Excel		Interoperability between disparate Financial systems (XBML)
		Access		
		SAS		Bloomberg Terminals
		Spreadsheets		
		Financial programs (Peachtree, QuickBooks)		PeopleSoft
		SAP Financials		
		In-house developed		
		Bloomberg		
		PeopleSoft		

### 11.3.2 Portfolio Management

Support the administration of a group of investments held by an organization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Financial Portfolio Mgmt</b>		In-house developed		GAAP Compliant
		Portfolio and Investment Planning		
		DESKTOP		
		Excel		
		Quicken		
		Money		
		SAS		

<p><b>Investment Tracking</b></p>		<p>The Vault – In house developed</p> <p>Pool Manager – Proprietary</p>		
<p><b>IT Project Portfolio Mgmt</b></p>		<p>Components could include:</p> <p>Application Portfolio Mgmt</p> <p>Project Portfolio Mgmt</p> <p>Project and Budget Mgmt</p> <p>Demand Management</p> <p>Resource Management</p> <p>Time Tracking</p> <p>Client Management</p> <p>Performance Management</p> <p>Knowledge Management</p> <p>Financial Management</p> <p>Workflow</p> <p>Reporting</p>		<p>Components could include:</p> <p>Portfolio and Investment Planning</p> <p>Application Portfolio Mgmt</p> <p>Project Portfolio Mgmt</p> <p>Project and Budget Mgmt</p> <p>Demand Management</p> <p>Resource Management</p> <p>Time Tracking</p> <p>Client Management</p> <p>Performance Management</p> <p>Knowledge Management</p> <p>Financial Management</p> <p>Workflow</p> <p>Reporting</p>

### 11.3.3 Performance Management

Measure the effectiveness of an organization's financial assets and capital

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Investment Tracking and Mgmt</b>		The Vault Pool Manager		GAAP Compliance

## Chapter 12 Digital Asset Services

The Digital Asset Services Domain defines the set of capabilities that support the generation, management, and distribution of intellectual capital and electronic media across the business and extended enterprise. A *digital asset* is an electronic object that has value for some purpose. It may have been created digitally or it may have been digitized from a non-digital original source. Examples of digital assets include word processing documents, databases, websites, organizational records, digital recordings of musical performances, etc. (“Preservation Planning for Digital Information: Final Report of the HVC<sup>2</sup> Digital Preservation Task Force,” KU, November 2004)

### 12.1 Content Management

Capabilities within this Service Type manage the storage, maintenance and retrieval of documents and information of a system or web site.

#### 12.1.1 Content Authoring

Allow for the creation of tutorials, CBT courseware, web sites, CD-ROMs and other interactive programs

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Markup Languages</b>		SGML/HTML XML		XML
<b>Authoring Tools (Examples)</b>		XML: XML Spy Xmetal XML Cookbook Dreamweaver Camtasia Studio	OpenOffice	
<b>Structural Description</b>		IMS		

#### 12.1.2 Content Review and Approval

Allow for the approval of interactive programs

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Version Control</b>		Embedded in Content/Document Management System		Embedded in Content/Document Management System
<b>Workflow</b>		Embedded in Content/Document Management System		Embedded in Content/Document Management System

### 12.1.3 Tagging and Aggregation

Support the identification of specific content within a larger set of content for collection and summarization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Descriptive Metadata</b>		Dublin Core Domain Specific Schemas/Formats Domain Specific Profiles		Dublin Core Domain Specific Schemas/Formats Domain Specific Profiles
<b>Semantic Markup</b>		SGML XML Domain Specific Markup Profiles	Web 2.0 Tagging Resource Description Framework (RDF)	SGML XML Domain Specific Markup Profiles

### 12.1.4 Content Publishing and Delivery

Allow for the propagation of digital assets

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>XML Query Language</b>		XPATH		XPATH
<b>Presentation</b>		CSS XSL		CSS XSL
<b>XML Transformation</b>		XSLT		XSLT
<b>Content Syndication</b>		RSS Services Atom Syndication Format		RSS Services Atom Syndication Format

### 12.1.5 Syndication Management

Control and regulate an organization's brand

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Digital Rights Management – see Records Management topic below</b>				

## 12.2 Document Management

Capabilities within this Service Type control the capture and maintenance of an organization's documents and files.

Electronic Document Management Systems (EDMS) is becoming an all-encompassing term, referring to the integration of the underlying technologies including:

- Document imaging
- Document/Library services
- Workflow
- Enterprise Report Management (ERM)
- Forms Management
- Optical Character Recognition (OCR)/Intelligent Character Recognition (ICR) Technologies

Electronic document management systems provide users with access to more applications within a common user interface, through the utilization of industry standard Internet browser technology. One of the primary reasons users prefer this level of technology is the distributed functionality that becomes available almost immediately after implementation. (AIIM, "Recommended Practice: Analysis, Selection, and Implementation Guidelines Associated with Electronic Document Management Systems (EDMS)," April 2006)

### 12.2.1 Document Imaging and OCR

Support the scanning of documents

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Document Imaging</b>		Standard Recommended Practice, File Format for Storage and Exchange of Images; Bi-Level Image File Format: Part I (ANSI/AIIM MS53-1993)  Electronic Imaging Output/Display Devices (AIIM/TR19-1993)  Electronic Imaging Output/Printers (AIIM/TR29-1993)		Standard Recommended Practice, File Format for Storage and Exchange of Images; Bi-Level Image File Format: Part I (ANSI/AIIM MS53-1993)  Electronic Imaging Output/Display Devices (AIIM/TR19-1993)  Electronic Imaging Output/Printers (AIIM/TR29-1993)

<p><b>Optical Character Recognition (OCR)</b></p>		<p>Alphanumeric Character Sets for Optical Recognition, Part I: "Character Set of OCR-A- Shapes and Dimensions of the Printed Image" (ISO 1073/1-1976)</p> <p>Alphanumeric Character Sets for Optical Recognition, Part II: "Character Set OCR-B- Shapes and Dimensions of the Printed Image" (ISO 1073/2-1976)</p> <p>Character Sets for Optical Character Recognition, Adopted 13 September, 1989 (FIPS PUB 32-1; Incorporates OCR-A and OCR-B. Adopts ANSI X3.2-1970 (R1976), ANSI X3.49-1975 (R1982))</p> <p>Optical Character Recognition Positioning (ANSI X3.93M-1981 (R1989))</p> <p>Guideline for Optical Character Recognition Print Quality (ANSI X3.99-1983 (R1991))</p>		<p>Alphanumeric Character Sets for Optical Recognition, Part I: "Character Set of OCR-A- Shapes and Dimensions of the Printed Image" (ISO 1073/1-1976)</p> <p>Alphanumeric Character Sets for Optical Recognition, Part II: "Character Set OCR-B- Shapes and Dimensions of the Printed Image" (ISO 1073/2-1976)</p> <p>Character Sets for Optical Character Recognition, Adopted 13 September, 1989 (FIPS PUB 32-1; Incorporates OCR-A and OCR-B. Adopts ANSI X3.2-1970 (R1976), ANSI X3.49-1975 (R1982))</p> <p>Optical Character Recognition Positioning (ANSI X3.93M-1981 (R1989))</p> <p>Guideline for Optical Character Recognition Print Quality (ANSI X3.99-1983 (R1991))</p>
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### 12.2.2 Document Referencing

Support the redirection to other documents and information for related content

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Item Identifiers</b>		Archival Resource Key (ARK)	XML Pointer (XPointer)	Archival Resource Key (ARK)
		Document Object Identifier (DOI)		Document Object Identifier (DOI)
		Handles		Handles
		Namespace		Namespace
		Open URL		Open URL
		Persistent URL		Persistent URL

### 12.2.3 Document Revisions

Support the versioning and editing of content and documents

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Version Control</b>		Embedded in Content/Document Management System		Embedded in Content/Document Management System
<b>Workflow</b>		Embedded in Content/Document Management System		Embedded in Content/Document Management System

### 12.2.4 Library / Storage

Support document and data warehousing and archiving

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Data Warehousing</b>		See Section 14.1.3, Data Management, Data Warehouse		
<b>Information Lifecycle Management – Physical Storage Considerations</b>			Long Term Archive and Compliance Storage Initiative (LTACSI) Standards	Long Term Archive and Compliance Storage Initiative (LTACSI)

### 12.2.5 Document Review and Approval

Support the editing and commendation of documents before releasing them

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Version Control</b>		Embedded in Content/Document Management System		Embedded in Content/Document Management System
<b>Workflow</b>		Embedded in Content/Document Management System		Embedded in Content/Document Management System

### 12.2.6 Document Conversion

Support the changing of files from one type of format to another

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
		In General Avoid Proprietary Formats Where Possible and Convert to Open Formats  See Section 8.2.1		In General Avoid Proprietary Formats Where Possible and Convert to Open Formats  See Section 8.2.1

### 12.2.7 Indexing Support

The rapid retrieval of documents through a structured numbering construct

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Structured Classification Schemes</b>		See Data Interoperability section (14.1.9)		

### 12.2.8 Classification

Support the categorization of documents

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Classification Schemes</b>		See Data Interoperability section (14.1.9)		

## 12.3 Knowledge Management

Capabilities within this Service Type identify, gather and transform documents, reports and other sources into meaningful information. Knowledge Management is a business process for managing intellectual assets in such a way that improves an employee's comprehension in a specific area of interest.

1) A business process for managing intellectual assets. It is a discipline that promotes an integrated approach to creating, capture, organization, access, and use of an organization's knowledge and information assets. Examples are structured databases, textual data, etc., and the tacit knowledge and expertise of individual employees.

2) The systematic process of finding, selecting, organizing, distilling and presenting information in a way that improves an employee's comprehension in a specific area of interest. (Source: Educause, [http://www.educause.edu/Browse/645?PARENT\\_ID=229](http://www.educause.edu/Browse/645?PARENT_ID=229), accessed 5/26/06)

### 12.3.1 Information Retrieval

Allow access to data and information for use by an organization and its stakeholders

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Search		See Section 15.3		

### 12.3.2 Information Mapping / Taxonomy

Support the creation and maintenance of relationships between data entities, naming standards and categorization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Search, Classification		See Section 15.3		

### 12.3.3 Information Sharing

Support the use of documents and data in a multi-user environment for use by an organization and its stakeholders

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
		See Section 11.2.1, Workgroup / Groupware		

### 12.3.4 Categorization

Allow classification of data and information into specific layers or types to support an organization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Classification		See Section 14.1.9		

### 12.3.5 Knowledge Engineering

Support the translation of knowledge from an expert into the knowledge base of an expert system

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

### 12.3.6 Knowledge Capture

Facilitate collection of data and information

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

### 12.3.7 Knowledge Distribution and Delivery

Support the transfer of knowledge to the end customer.

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

### 12.3.8 Smart Documents

Support the interaction of information and process (business logic) rules between users of the document. (i.e. the logic and use of the document is embedded within the document itself and is managed within the document parameters)

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

## 12.4 Records Management

Capabilities within this Service Type store, protect, archive, classify and retire documents and information.

Capabilities within this Service Type capture, categorize, assign disposition, associate, ensure authenticity, and execute disposition of an organization's records in accordance with state and federal statutes and regulations.

Other electronic records management analyses and standards are concerned with identical and in some cases broader than just the records life cycle, but they address different topics and/or viewpoints. For example, ANSI/ARMA/AIIM TR48-2004, Framework for Integration of Electronic Document Management Systems and Electronic Records Management Systems, is concerned with the integration of two types of standalone applications where records management functionality is provided well after records are created and managed in other applications. Similarly, DoD 5015.2-STD, Design Criteria Standard for Electronic Records Management Applications, addresses design for one type of records management implementation – not for records management services which can be implemented at the beginning of the record life cycle in any electronic environment to include a services-oriented architecture. Finally, ISO 15489-1: Information and Documentation - Records Management - Part 1: General; ISO/TR 15489-2 Information and Documentation - Records Management - Part 2: Guidelines, discuss guidelines and best practices for setting up an organizational records management program. (*Functional Requirements and Attributes for Records Management Services, December 7, 2005*; Interagency Project Team and the Records Management Service Components Program Office of the National Archives and Records Administration)

Records Management components break down as (from *Records Management Services (RMS) Overview*, National Archives and Records Administration, 2005, <http://www.archives.gov/era/pdf/rmsc-overview.pdf>):

Records Management Component	Definition
Capture Record	Capture Information with associated attributes in an electronic system.
Assign Disposition	Using an established disposition authority, assign the disposition schedule, item number, and disposition instructions to the record.
Categorize Record	Utilizing agency business rules, assign an appropriate descriptive label to the records to facilitate management in an electronic system.
Search Repository	Query all or selected system repositories of records (transitory, temporary, and permanent) across the enterprise for content and/or attributes, in order to determine the existence and location of matching records.
Retrieve Record	Using the search results, allow for the selective display of the full record and/or associated attributes for an authorized purpose.
Ensure Authenticity	Ensure the acceptability of a record as genuine, based on its characteristics such as structure, content, and context.
Associate Record	Provide the capability to associate a record to one or more other records through a Record Association attribute.
Execute Disposition	Implement destruction, transfer, or continued retention of a record in accordance with the established disposition authority. After validation that the disposition action is valid, execute the disposition action, and record the transaction.

### Other Important information for Records Management

- **Statutes Related to Records Management**
  - Government Records Preservation Act (KSA 45-401 through KSA 45-413) (online at <http://www.kshs.org/government/records/stategovt/recordslaw.htm>)
  - Kansas Acts Against Discrimination (KSA 44-1001 et seq)
  - Open Records Act (KSA 45-215 through 45-223) (online at <http://www.kshs.org/government/records/stategovt/recordslaw.htm>)
  - Public Records Act (KSA 75-3501 through 75-3518) (online at <http://www.kshs.org/government/records/stategovt/recordslaw.htm>)
  - Records made on Electronically-accessed Media; Authorization, Conditions and Procedures, Application, Notice to State Records Board (KSA 45-501) (online at <http://www.kshs.org/government/records/stategovt/recordslaw.htm>)
  - Tampering with a Public Record (KSA 21-3821) (online at <http://www.kshs.org/government/records/stategovt/recordslaw.htm>)
  - Telecommunications services of certain state agencies; extension to certain private, nonprofit agencies or governmental entities; records of services (KSA 75-4709) (online at <http://www.kshs.org/government/records/stategovt/recordslaw.htm>)
  - Federal statutes that may apply to specific agencies
- **Standards Related to Records Management**
  - Department of Defense 5015.2-STD, "Design Criteria Standard for Electronic Records Management Applications" (Online at <http://jitic.fhu.disa.mil/recmgt/#standard>)
  - ISO 23081-1:2006: "Information and documentation - Records management processes - Metadata for records - Part 1: Principles" (Available for purchase through ANSI at <http://webstore.ansi.org/ansidocstore/product.asp?sku=ISO+23081%2D1%3A2006>)
  - ISO/TR 15489-2:2001: "Information and documentation - Records management - Part 2: Guidelines" (Available for purchase through ANSI at <http://webstore.ansi.org/ansidocstore/product.asp?sku=ISO%2FTR+15489%2D2%3A2001>)
  - Federal Section 508 Electronic and Information Technology Accessibility Standards (36 CFR § 1194) (Online at <http://www.section508.gov/>)
  - Information Technology Policy 1210: State of Kansas Web Accessibility Requirements (Online at <http://www.da.ks.gov/itec/documents/itecitemapolicy1210.htm>)

**12.4.1 Record Linking / Association**

Support the correlation between logical data and information sets

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

**12.4.2 Document Classification**

Support the categorization of documents and artifacts, both electronic and physical

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

**12.4.3 Document Retirement**

Support the termination or cancellation of documents and artifacts used by an organization and its Stakeholders

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

### 12.4.4 Digital Rights Management

Support the claim and ownership of intellectual capital and artifacts belonging to an organization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Digital Rights Management</b>		ISO MPEG REL Adobe Content Manager Creative Commons MPEG-21/5 PRISM	ERMI FDRM METS ODRL XACML	

## Chapter 13 Business Analytical Services

The Business Analytical Services Domain defines the set of capabilities supporting the extraction, aggregation, and presentation of information to facilitate decision analysis and business evaluation

### 13.1 Analysis and Statistics

Capabilities within this Service Type examine business issues, problems and their solutions.

#### 13.1.1 Mathematical

Support the formulation and mathematical analysis of probabilistic models for random phenomena and the development and investigation of methods and principles for statistical inference

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

Description	Example Products	Notes
General Quantitative and Statistical Analysis	SAS SPSS	
Domain-specific tools		This area has too many specific products to catalog

#### 13.1.2 Structural / Thermal

Support the use of data flow and data modeling diagrams for applying systematic analysis of data

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

Description	Example Products	Notes
Domain-specific tools		This area has too many specific products to catalog

#### 13.1.3 Radiological

Support the use of radiation and x-ray technologies for analysis and scientific examination

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

Description	Example Products	Notes
Domain-specific tools		This area has too many specific products to catalog

### 13.1.4 Forensics

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

Description	Example Products	Notes
Domain-specific tools		This area has too many specific products to catalog

## 13.2 Visualization

Capabilities within this Service Type convert data into graphical or picture form.

### 13.2.1 Graphing / Charting

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Graphing / Charting</b>		Standard Database Linkage (JDBC, ODBC)  Integrated drawing tools  Multiple graphing / charting types supported (i.e. bar, radar, etc.)		Standard Database Linkage (JDBC, ODBC)  Integrated drawing tools  Multiple graphing / charting types supported (i.e. bar, radar, etc.)

Description	Example Products	Notes
<b>Graphing / Charting</b>	<ul style="list-style-type: none"> <li>• Microsoft Visio</li> <li>• SAS</li> <li>• SPSS</li> <li>• Crystal Reports</li> <li>• Microsoft Project</li> <li>• Microsoft Excel</li> <li>• Erwin</li> <li>• SQL Reports</li> <li>• PhotoShop</li> <li>• Jfree Chart</li> <li>• ILog</li> </ul> <p>Domain-specific tools</p>	

### 13.2.2 Imagery

Support the creation of film or electronic images from pictures or paper forms

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Digital Scanning</b>		Scan to PDF  Scan to multiple file formats including TIFF, JPEG, JPG2000, etc.		Scan to PDF  Scan to multiple file formats including TIFF, JPEG, JPG2000, etc.

<b>Microform (microfilm, microfiche)</b>		<p>NISO and ANSI standards including:</p> <p>ANSI/NISO Z39.32 - 1996 (R2002) Information on Microfiche Headers</p> <p>ANSI/NISO Z39.62 - 2000 Eye-legible Information on Microfilm Leaders and Trailers and on Containers of Processed Microfilm on Open Reels</p> <p>ANSI/NISO Z39.74 - 1996 (R2002) Guides to Accompany Microform Sets</p>		<p>NISO and ANSI standards including:</p> <p>ANSI/NISO Z39.32 - 1996 (R2002) Information on Microfiche Headers</p> <p>ANSI/NISO Z39.62 - 2000 Eye-legible Information on Microfilm Leaders and Trailers and on Containers of Processed Microfilm on Open Reels</p> <p>ANSI/NISO Z39.74 - 1996 (R2002) Guides to Accompany Microform Sets</p>
<b>Photographs</b>		<p>Multiple ANSI standards covering chemicals, film, processing, etc.  <a href="http://www.nssn.org/search/IntelSearch.aspx">http://www.nssn.org/search/IntelSearch.aspx</a></p>		<p>Multiple ANSI standards covering chemicals, film, processing, etc.  <a href="http://www.nssn.org/search/IntelSearch.aspx">http://www.nssn.org/search/IntelSearch.aspx</a></p>
<b>Digital photographs</b>		<p>Multiple ANSI standards covering pixel-reporting, color-encoding, format profiles, etc.  <a href="http://www.nssn.org/search/IntelSearch.aspx">http://www.nssn.org/search/IntelSearch.aspx</a></p>		<p>Multiple ANSI standards covering pixel-reporting, color-encoding, format profiles, etc.  <a href="http://www.nssn.org/search/IntelSearch.aspx">http://www.nssn.org/search/IntelSearch.aspx</a></p>

### 13.2.3 Multimedia

Support the representation of information in more than one form to include text, audio, graphics, animated graphics and full motion video

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Multimedia</b>				

Description	Example Products	Notes
<b>Multimedia</b>	<ul style="list-style-type: none"> <li>• Microsoft Powerpoint</li> <li>• OpenOffice presentation software</li> <li>• Apple Macintosh Software</li> </ul>	

### 13.2.4 Mapping / Geospatial / Elevation / GPS

Provide for the representation of position information through the use of attributes such as elevation, latitude, and longitude coordinates

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Mapping / Geospatial / Elevation / GPS</b>		Data input <ul style="list-style-type: none"> <li>○ Manual digitizing</li> <li>○ Scanning</li> <li>○ Keyed bulk data entry</li> <li>○ Automatic checking and corrections for digitizing errors</li> <li>○ Acceptance of existing raster and vector data</li> </ul> Data manipulation <ul style="list-style-type: none"> <li>○ Data revisions</li> <li>○ Thinning and weeding of digital line work</li> <li>○ Sliver polygon removal</li> <li>○ Transformation between map projections</li> <li>○ Edge matching of adjoining map files</li> <li>○ Transformation of data to fit specified control points (i.e. rubber sheeting)</li> <li>○ Raster to vector conversion</li> <li>○ Merging polygons with common attributes</li> <li>○ Computing distance buffers</li> <li>○ Aggregating data within specified parameters</li> </ul> Data analysis <ul style="list-style-type: none"> <li>○ Point, line, and polygon overlay analysis</li> <li>○ Geometric measurements and calculations</li> <li>○ Analysis of proximity and contiguity</li> <li>○ Spatial data queries</li> <li>○ Attribute data queries</li> <li>○ Coordinate geometry calculations</li> <li>○ Digital terrain modeling and analysis</li> </ul>		Data input <ul style="list-style-type: none"> <li>○ Manual digitizing</li> <li>○ Scanning</li> <li>○ Keyed bulk data entry</li> <li>○ Automatic checking and corrections for digitizing errors</li> <li>○ Acceptance of existing raster and vector data</li> </ul> Data manipulation <ul style="list-style-type: none"> <li>○ Data revisions</li> <li>○ Thinning and weeding of digital line work</li> <li>○ Sliver polygon removal</li> <li>○ Transformation between map projections</li> <li>○ Edge matching of adjoining map files</li> <li>○ Transformation of data to fit specified control points (i.e. rubber sheeting)</li> <li>○ Raster to vector conversion</li> <li>○ Merging polygons with common attributes</li> <li>○ Computing distance buffers</li> <li>○ Aggregating data within specified parameters</li> </ul> Data analysis <ul style="list-style-type: none"> <li>○ Point, line, and polygon overlay analysis</li> <li>○ Geometric measurements and calculations</li> <li>○ Analysis of proximity and contiguity</li> <li>○ Spatial data queries</li> <li>○ Attribute data queries</li> <li>○ Coordinate geometry calculations</li> <li>○ Digital terrain modeling and analysis</li> </ul>

		<ul style="list-style-type: none"> <li>○ Network analysis</li> </ul> <p>Data presentation</p> <ul style="list-style-type: none"> <li>○ Display and plot of raster and/or vector data</li> <li>○ Display and plot of data at user-defined scales</li> <li>○ Display and plot of digital terrain models</li> <li>○ Automatic plot of attribute data as map text</li> <li>○ Automatic generation of map symbols based on attribute data</li> <li>○ Automatic dimensioning</li> <li>○ Specific printer and plotter capabilities</li> <li>○ Specific report and map output formats</li> </ul>		<ul style="list-style-type: none"> <li>○ Network analysis</li> </ul> <p>Data presentation</p> <ul style="list-style-type: none"> <li>○ Display and plot of raster and/or vector data</li> <li>○ Display and plot of data at user-defined scales</li> <li>○ Display and plot of digital terrain models</li> <li>○ Automatic plot of attribute data as map text</li> <li>○ Automatic generation of map symbols based on attribute data</li> <li>○ Automatic dimensioning</li> <li>○ Specific printer and plotter capabilities</li> <li>○ Specific report and map output formats</li> </ul>
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Description	Example Products	Notes
Mapping / Geospatial / Elevation / GPS	<ul style="list-style-type: none"> <li>• ESRI ArcGIS</li> <li>• OpenARC</li> <li>• OpenGIS standard products</li> </ul>	

### 13.2.5 CAD

Support the design of products with computers

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
2D Design				
3D Design				

Description	Example Products	Notes
CAD	AutoCAD  Microstation  Domain-specific tools	

## 13.3 Knowledge Discovery

Capabilities within this Service Type facilitate the identification of useful information from data.

### 13.3.1 Data Mining

Provide for the efficient discovery of non-obvious, valuable patterns and relationships within a large collection of data

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Data Mining</b>		Domain-specific tools		

### 13.3.2 Modeling

Develop descriptions to adequately explain relevant data for the purpose of prediction, pattern detection, exploration or general organization of data

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Modeling</b>		Domain-specific tools		

### 13.3.3 Simulation

Utilize models to mimic real-world processes

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Simulation</b>		Domain-specific tools		

## 13.4 Business Intelligence

### 13.4.1 Demand Forecasting / Management

Facilitate the prediction of sufficient production to meet an organization's sales of a product or service

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Demand Forecasting and Management</b>		Manual Process		
		Domain-specific tools		

### 13.4.2 Balanced Scorecard

Support the listing and analyzing of both positive and negative impacts associated with a decision

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Balanced Scorecard</b>		Manual Process		
		COBIT		
		SQL Reporting		

### 13.4.3 Decision Support and Planning

Support the analysis of information and predict the impact of decisions before they are made

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Decision Support and Planning</b>		Manual Process	Visualization	Visualization
			Dashboards	Dashboards

## 13.5 Reporting

Capabilities within this Service Type organize data into useful information

### 13.5.1 Ad hoc

Support the use of dynamic reports on an as needed basis

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Textual</b>		Interoperability with multiple data sources	Open, Standardized Metadata	Interoperability with multiple data sources
<b>Numeric</b>		SQL query support		SQL query support
		XML support		XML support
		Ability to script		Ability to script
		Standard Database Connections (ODBC, JDBC)		Standard Database Connections (ODBC, JDBC)
		Web interface using forms		Web interface using forms
				ITEC Policy 1210 Compliant
				Open, Standardized Metadata

Description	Example Products	Notes
	<ul style="list-style-type: none"> <li>• Crystal Reports</li> <li>• SAS</li> <li>• Microsoft Excel</li> <li>• Microsoft Access</li> <li>• JReport</li> <li>• Alphablox (IBM)</li> <li>• Business Objects</li> <li>• Oracle/PeopleSoft</li> </ul>	
<b>Specialized Programs</b>		

### 13.5.2 Standardized / Canned

Support the use of pre-conceived or pre-written reports

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Textual</b>		Interoperability with multiple data sources	Open, Standardized Metadata	Interoperability with multiple data sources
<b>Numeric</b>		SQL query support		SQL query support

		XML support Ability to script Standard Database Connections (ODBC, JDBC) Web interface using forms		XML support Ability to script Standard Database Connections (ODBC, JDBC) Web interface using forms ITEC Policy 1210 Compliant Open, Standardized Metadata
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Description	Example Products	Notes
	Crystal Reports SAS	

### 13.5.3 OLAP

Support the analysis of information that has been summarized into multidimensional views and hierarchies

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Textual</b> <b>Numeric</b>		Interoperability with multiple data sources SQL query support XML support Ability to script Standard Database Connections (ODBC, JDBC)	Open, Standardized Metadata	Interoperability with multiple data sources SQL query support XML support Ability to script Standard Database Connections (ODBC, JDBC) Open, Standardized Metadata

Description	Example Products	Notes
	SAS	
	Data warehouse system integrated reporting	

## Chapter 14 Back Office Services

The Back Office Services Domain defines the set of capabilities that support the management of enterprise planning and transactional-based functions.

### 14.1 Data Management

Capabilities within this Service Type provide for the usage, processing and general administration of unstructured information.

#### 14.1.1 Data Exchange

Support the interchange of information between multiple systems or applications; includes verification that transmitted data was received unaltered

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Transport Method</b>	Diskettes  Tapes  Paper	Email  Batch File Transfer  Internet  Embedded application distribution services		Email  Batch File Transfer  Internet  Embedded application distribution services
<b>Data Format and Content Identification</b>	Use of specific proprietary or legacy system formats agreed upon on a case-by-case basis.	Use of specific proprietary or legacy system formats agreed upon on a case-by-case basis.	Adhere to XML, EDI, or other similar conventions to publish or exchange content in a technology-neutral, standard way  Adopt SOAP philosophies.	Adhere to XML, EDI, or other similar conventions to publish or exchange content in a technology-neutral, standard way.  Adopt SOAP philosophies.
<b>Security, Integrity, and Quality Assurance</b>		Use of Encryption Technologies, Security Tokens, Checksum algorithms, and Digital Signatures  Adherence to FIPS 186-2 (DSS).  Establish verification procedures  Use of SSL.	Adherence to FIPS 186-3 (DSS).  Use of TLS.	Use of Encryption Technologies, Security Tokens, Checksum algorithms, and Digital Signatures  Adherence to FIPS 186-3 (DSS).  Establish verification procedures  Use of TLS.

<b>Platform and Language Independence</b>		ODBC	Use of SOAP (for data exchange), ODBC (for query-type “exchange”), or other similar philosophies.	Use of SOAP (for data exchange), ODBC (for query-type “exchange”), or other similar philosophies.
<b>Data Compression</b>		<p>Adaptive Coding with Embedded Dictionary (DCLZ Algorithm) for Information Interchange (ANSI INCITS 223-1995 (R2001))</p> <p>Adaptive Coding with Sliding Window for Information Interchange (ANSI INCITS 241-1994 (R1999))</p> <p>Adaptive Lossless Data Compression (ALDC) Algorithm for Information Interchange (ANSI INCITS 280-1996 (R2001))</p> <p>Adaptive Lossless Data Compression algorithm (ALDC) (ISO/IEC 15200:1996)</p> <p>Binary Arithmetic Coding Algorithm (ISO/IEC 12042:1993)</p> <p>DCLZ Algorithm (ISO/IEC 11558:1992)</p> <p>FBI Wavelet/Scalar Quantization Specification (compression of digitized fingerprint images)</p> <p>ISO/IEC 14495-2:2003 (Lossless and near-lossless compression of continuous-tone still</p>		<p>Adaptive Coding with Embedded Dictionary (DCLZ Algorithm) for Information Interchange (ANSI INCITS 223-1995 (R2001))</p> <p>Adaptive Coding with Sliding Window for Information Interchange (ANSI INCITS 241-1994 (R1999))</p> <p>Adaptive Lossless Data Compression (ALDC) Algorithm for Information Interchange (ANSI INCITS 280-1996 (R2001))</p> <p>Adaptive Lossless Data Compression algorithm (ALDC) (ISO/IEC 15200:1996)</p> <p>Binary Arithmetic Coding Algorithm (ISO/IEC 12042:1993)</p> <p>DCLZ Algorithm (ISO/IEC 11558:1992)</p> <p>FBI Wavelet/Scalar Quantization Specification (compression of digitized fingerprint images)</p> <p>ISO/IEC 14495-2:2003 (Lossless and near-lossless compression of continuous-tone still</p>

		images)  JPEG 2000 image coding system - Part 1: Core coding system (INCITS/ISO/IEC 15444-1-2000)  Streaming Lossless Data Compression algorithm (SLDC) (ISO/IEC 22091:2002)		images)  JPEG 2000 image coding system - Part 1: Core coding system (INCITS/ISO/IEC 15444-1-2000)  Streaming Lossless Data Compression algorithm (SLDC) (ISO/IEC 22091:2002)
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### 14.1.2 Data Mart

Support a subset of a data warehouse for a single department or function within an organization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

### 14.1.3 Data Warehouse

Support the archiving and storage of large volumes of data

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Data Staging</b>		Code Library Management and Version Control  Data Staging Job Control	Metadata-Driven Data Staging	Code Library Management and Version Control  Data Staging Job Control
<b>Metadata Repository Development and Maintenance</b>		Information catalog integration/merge (e.g., from the data model to the database to the front end reporting tool)  Manage and display graphical or tabular representation of metadata repository contents (metadata browser)		Information catalog integration/merge (e.g., from the data model to the database to the front end reporting tool)  Manage and display graphical or tabular representation of metadata repository contents (metadata browser)

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Data Access (Reporting)</b>		<p>Operational Data Store (Isolated Reporting Environment)</p> <p>Parameter or variable driven capabilities</p> <p>Time and event based scheduling of report execution</p> <p>Iterative execution</p> <p>Support multiple delivery methods and formats (email, web, network directory)</p> <p>Report linking</p> <p>Mass report distribution support via email, web or network directory</p> <p>User interface controls for conceptual representations such as gauges and sophisticated charting.</p> <p>Alerts or exception controls that monitor specific values, ranges or differences that notify the user when targeted levels are met or exceeded. (Performance management)</p>		<p>Operational Data Store (Isolated Reporting Environment)</p> <p>Parameter or variable driven capabilities</p> <p>Time and event based scheduling of report execution</p> <p>Support multiple delivery methods and formats (email, web, network directory)</p> <p>Report linking</p> <p>Mass report distribution support via email, web or network directory</p> <p>User interface controls for conceptual representations such as gauges and sophisticated charting.</p> <p>Alerts or exception controls that monitor specific values, ranges or differences that notify the user when targeted levels are met or exceeded. (Performance management)</p>

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Data Access (Ad Hoc Query)</b>		Multi-pass SQL Highlighting and conditional formatting Successive constraints Direct SQL Entry Basic calculations on the result set Dataset pivoting Column calculations on pivot results Sorting Charting and Graphs Metadata access Export to multiple formats (XML, EXCEL, PDF, CSV)		Multi-pass SQL Highlighting and conditional formatting Successive constraints Direct SQL Entry Basic calculations on the result set Dataset pivoting Column calculations on pivot results Sorting Charting and Graphs Metadata access Export to multiple formats (XML, EXCEL, PDF, CSV)
<b>Data Modeling and Mining</b>		Clustering Support Classifying Estimating and Predictive Analysis Affinity Grouping		Clustering Support Classifying Estimating and Predictive Analysis Affinity Grouping

#### 14.1.4 Meta Data Warehouse

Support the maintenance and administration of data that describes data

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Format</b>	Meta Data Coalition Open Information Model 1.0	Common Warehouse Metamodel (CWM)		Common Warehouse Metamodel (CWM)
<b>Metadata Modeling</b>		Unified Modeling Language (UML) 2.0		Unified Modeling Language (UML) 2.0

### 14.1.5 Data Cleansing

Support the removal of incorrect or unnecessary characters and data from a data source

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Data Cleansing				

### 14.1.6 Extraction and Transformation

Support the manipulation and change of data

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Extraction and Transformation</b>	Hand-written scripts	<p>Hand-written scripts and tools bundled with the underlying database that have limited out-of-the box functionality.</p> <p>XML Data Interchange (XMI)</p> <p>Integrate with XML.</p> <p>Standards based metadata</p>	<p>Leverage existing code as well as bring new functionality.</p> <p>Allow for the incorporation of existing working scripts and offer a complete tool set of ready to use transformations and functions as well as a comprehensive list of documented APIs and methods.</p> <p>Improve metadata management and administration as well as ensure data quality.</p> <p>Able to do upfront analysis and modeling and streamline the workflow process.</p> <p>Integrate with Message Brokers.</p>	<p>Integrate with XML.</p> <p>XML Data Interchange (XMI)</p> <p>Integrate with Message Brokers.</p> <p>Standards based metadata</p> <p>Leverage existing code as well as bring new functionality.</p> <p>Allow for the incorporation of existing working scripts and offer a complete tool set of ready to use transformations and functions as well as a comprehensive list of documented APIs and methods.</p> <p>Improve metadata management and administration as well as ensure data quality.</p> <p>Able to do upfront analysis and modeling and streamline the workflow process.</p>

### 14.1.7 Loading and Archiving

Support the population of a data source with external data

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Methodology</b>	<ul style="list-style-type: none"> <li>Copy to floppy disk</li> </ul>	Customized applications and scripts  Database import and export tools  SQL  ODBC, JDBC, OLE  XML  Vendor supplied applications  Copy to CDs and DVDs  Print to Paper  Reformat to Microfilm	Automated capture and apply middleware  Stored procedures  Virtual warehouses  Converting archive data into XML format  RMA  Information Lifecycle Management issues <i>(see discussion under Digital Asset Services domain)</i>	Customized applications and scripts  Database import and export tools  SQL  ODBC, JDBC, OLE  XML  Automated capture and apply middleware  Stored procedures
<b>Data Loading</b>	<ul style="list-style-type: none"> <li>Import of data from static batch extractions</li> </ul>	Conceptual data model  Logical data model  Physical data model  Similarity of source and target structures  Simplified data inter-dependency	Metadata repositories  Load utilities that access the metadata of the source and target to automate the transform and load processes	Portable  Support for <ul style="list-style-type: none"> <li>Oracle</li> <li>Microsoft SQL Server</li> <li>Sybase</li> <li>IBM DB2</li> <li>flat files</li> <li>any JDBC-accessible data source.</li> </ul>
<b>Application</b>		Logging for: <ul style="list-style-type: none"> <li>Quality assurance</li> <li>Audit trail</li> <li>Error tracing and recovery</li> </ul>		Logging for: <ul style="list-style-type: none"> <li>Quality assurance</li> <li>Audit trail</li> <li>Error tracing and recovery</li> </ul>

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Technology</b>		<p>Platform independence – Minimally must support ODBC and OLE-DB connections.</p> <p>Database using single occurrence of DASD</p>	<p>Data Capture and Apply – allows automated loading of changed data from the source data store to the target data store.</p> <p>Disk mirroring for speed and convenience during the load process</p>	<p>Loading solutions built on an open architecture</p> <p>Re-usable custom extensions</p> <p>Open-standard Java-based server engine</p> <p>Platform independence – Minimally must support ODBC and OLE-DB connections.</p> <p>Database using single occurrence of DASD</p>
<b>Preservation</b>		<p>Data migration</p> <p>Disk upgrades</p>	<p>Preservation strategy built into lifecycle management processes</p>	<p><i>See section on Digital Asset Management for additional information</i></p>

#### 14.1.8 Data Recovery

Support the restoration and stabilization of data sets to a consistent, desired state

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Device-based</b>	<p>IDE</p> <p>SCSI</p> <p>PATA.</p>	<p>Fiber-Channel based.</p> <p>Image-based or snapshot technology.</p> <p>RAID 0 – 5</p> <p>EIDE</p>	<p>Image-based or snapshot technology</p> <p>RAID 6</p> <p>SATA</p> <p>FireWire (IEEE-1394)</p> <p>LTO-3</p> <p>AIT-6</p> <p>Sarbanes-Oxley</p>	<p>End-to-end redundancy</p> <p>High fault tolerance</p> <p>SATA</p> <p>FireWire (IEEE-1394)</p>

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Software-based		Automated recovery.  Point-in-time recovery. System-managed storage		Automated recovery  Point-in-time recovery  System-managed storage
Network-based		Adherence to NDMP	NDMP Version 5  SANs based upon IP	NDMP Version 5

#### 14.1.9 Data Classification

Allow the classification of data

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
General		Criteria: <ul style="list-style-type: none"> <li>○ Confidentiality</li> <li>○ Integrity</li> <li>○ Trustworthiness</li> <li>○ Availability</li> </ul>	Business requirements-based  Multi-faceted taxonomy serving: ILM  enterprise content management  compliance  data mining and decision support  security  Basis for enterprise information asset management	Criteria: <ul style="list-style-type: none"> <li>○ Confidentiality</li> <li>○ Integrity</li> <li>○ Trustworthiness</li> <li>○ Availability</li> </ul>

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Information Lifecycle Management</b>		<p>By-product of hierarchical storage management (HSM) implementations where the pervasive classification criterion was the age of the data.</p> <p>Criteria based on access or availability and recovery requirements, and cost.</p>	<p>Data classification assigns a level of business importance, availability, sensitivity, security, and regulation requirements to data. This process matches classifications of data with their proper tier of the storage infrastructure, as well as the appropriate security, compliance, data protection, migration and disaster recovery levels.</p> <p>Establishing a solid classification methodology is fundamental to organizational adoption and the ILM strategy.</p> <p>Example categories:</p> <ul style="list-style-type: none"> <li>○ Mission-critical online data</li> <li>○ Business-critical online data</li> <li>○ Accessible online data</li> <li>○ Nearline data</li> <li>○ Offline data</li> </ul>	<p>Criteria based on access or availability and recovery requirements, and cost.</p> <p>Data classification assigns a level of business importance, availability, sensitivity, security, and regulation requirements to data. This process matches classifications of data with their proper tier of the storage infrastructure, as well as the appropriate security, compliance, data protection, migration and disaster recovery levels. Establishing a solid classification methodology is fundamental to organizational adoption and the ILM strategy.</p> <p>Example categories:</p> <ul style="list-style-type: none"> <li>○ Mission-critical online data</li> <li>○ Business-critical online data</li> <li>○ Accessible online data</li> <li>○ Nearline data</li> <li>○ Offline data</li> </ul>

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Security</b>		<p>Classification of data determines the extent to which the data needs to be controlled / secured</p> <p>Classification of data is indicative of value in terms of <i>Business Assets</i>.</p> <p>Essential to distinguish what is of little value and what is highly sensitive and confidential</p> <p>Example classification scheme:</p> <ul style="list-style-type: none"> <li>○ <i>Confidential Data</i> – Do Not Share</li> <li>○ <i>Restricted Data</i> – Business Need To Know</li> <li>○ <i>Sensitive Data</i> – Share with Care</li> <li>○ <i>Public Data</i></li> </ul>		<p>Classification of data determines the extent to which the data needs to be controlled / secured</p> <ul style="list-style-type: none"> <li>● Classification of data is indicative of value in terms of <i>Business Assets</i>.</li> </ul> <p>Essential to distinguish what is of little value and what is highly sensitive and confidential</p> <p>Example classification scheme:</p> <ul style="list-style-type: none"> <li>○ <i>Confidential Data</i> – Do Not Share</li> <li>○ <i>Restricted Data</i> – Business Need To Know</li> <li>○ <i>Sensitive Data</i> – Share with Care</li> <li>○ <i>Public Data</i></li> </ul>
<b>Subject / Topic</b>	Uncontrolled	<p>Controlled Taxonomy within organizational units;</p> <p>Controlled Vocabulary</p>	<p>Controlled Taxonomy and Vocabulary for the enterprise;</p> <p>Concept Mapping</p>	<p>Controlled Taxonomy within organizational units;</p> <p>Controlled Vocabulary</p> <p>Concept Mapping</p>

## 14.2 Human Resources

Capabilities within this Service Type provide for the recruitment and management of personnel.

## 14.3 Financial Management

Capabilities within this Service Type provide the accounting practices and procedures that allow or the handling of revenues, funding and expenditures.

## 14.4 Assets / Materials Management

Capabilities within this Service Type support the acquisition, oversight and tracking of an organization's assets.

### 14.4.1 Computers Automation Management

Support the identification, upgrade, allocation and replacement of physical devices, including servers and desktops, used to facilitate production and process driven activities.

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Device Management</b>		Standard Replacement cycles (implies inventory of assets)  MS Report Manager 2006  Compaq  ZeroAdmin  Microsoft MMC		
<b>Event Management</b>	Unicenter TNG  Novell Manage Wise	CA – OPS  SNMP Protocol  MIB  Jobtrack  CA Unicenter TNG	PeopleSoft Asset Manager	

## 14.5 Development and Integration

Capabilities within this Service Type provide communication between hardware/software applications and the activities associated with deployment of software applications.

### 14.5.1 Legacy Integration

Support the determination of long-term goals and the identification of the best approach for achieving those goals

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Legacy Integration Planning</b>		<p>Migrate from mainframe to client-server</p> <p>“Rip-and-Replace” – replacement of large, installed bases of mature software with new products</p>	<p>Service Oriented Architecture</p> <p>Service Oriented Programming</p> <p>Expose legacy transactions as services</p> <p>Application rationalization</p> <p>Application Portfolio Management (APM)</p> <p>Decision metrics:</p> <ul style="list-style-type: none"> <li>• application size (in lines of code or function points)</li> <li>• Complexity</li> <li>• maintenance activity</li> <li>• calendar year cost</li> </ul> <p>Compliance exposure (HIPAA, Sarbanes Oxley, FERPA, etc.)</p>	
<b>Legacy Integration Strategies</b>	Componentize	<p>Web-to-Host</p> <p>“Green-screen in a browser”</p> <p>Interface re-engineering: converts the 3270 interface to a graphical UI and permits navigational changes to the screen flow</p> <p>Screen components:</p>		

		wrap screen functions as Enterprise JavaBeans (EJB), XML, and component object model (COM) components  Web-Service-to-Host  Migrate from Platform  Migrate from DBMS  Migrate from Language  Outsource  Replacement <ul style="list-style-type: none"> <li>• Rewrite application</li> <li>• Use packaged application</li> <li>• Use hosted application</li> <li>• Acquire open-source version</li> </ul> Application retirement		
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### 14.5.2 Enterprise Application Integration

Support the redesigning of disparate information systems into one system that uses a common set of data structures and rules

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Integration Design</b>		Manual Process	Application Portfolio Management (APM)	
<b>Application Integration Methods</b>		Enterprise Service Bus (ESB)  Rich clients  Composite Applications  Collaboration Platforms (proprietary)	SOA  Multichannel integration  Business Process Management (BPM) using BPEL  Collaboration Platforms (open)	

		<p>Platform vendor technology</p> <p>Independent integration vendor technology; features such as:</p> <ul style="list-style-type: none"> <li>• Embedded process modeling</li> <li>• XML-based messaging</li> <li>• Vertical industry templates</li> <li>• Standards-based (J2EE, Web Services, BPM, BAM, .NET, etc.)</li> </ul>	<p>standards-based)</p> <p>Integration Platforms with functions including:</p> <ul style="list-style-type: none"> <li>• Message bus</li> <li>• Integrated process management</li> <li>• Presentation and user interaction features</li> <li>• Life-cycle management</li> </ul>	
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### 14.5.3 Data Integration

Support the organization of data from separate data sources into a single source using middleware or application integration as well as the modification of system data models to capture new information within a single system

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Data Integration Methods</b>		<p>OAI-PMH standard</p> <p>Enterprise Information Integration platforms for distributed query and aggregation, data grids, ETL</p> <p>Federated search technology</p> <p>Enterprise content management</p>	<p>Universal Data Integration Platforms (consolidate selected data integration functions to satisfy requirements for real-time information):</p> <ul style="list-style-type: none"> <li>• Data access control</li> <li>• Service registries</li> <li>•</li> <li>• Transformation, query, aggregation, metadata mapping</li> <li>• Data process control</li> <li>• Business intelligence components</li> <li>• Quality remediation</li> <li>• Quality of Service</li> <li>• Life-cycle support</li> </ul> <p>Data Integration Services (wrap often separate data integration functions in Web services and/or other widely used interfaces to enable reuse and interconnection of integration silos. These data integration services don't actually perform the data integration functions; they merely provide standard access points to them.):</p> <p>Similar functions as above</p>	

#### 14.5.4 Instrumentation and Testing

Support the validation of application or system capabilities and requirements

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Functional Testing		Manual		
		Automatic		
Performance Testing		Manual		
		Automatic		

#### 14.5.5 Software Development

Support the creation of both graphical and process application or system software.

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

## Chapter 15 Support Services

The Support Services Domain defines the set of cross-functional capabilities that can be leveraged independent of Service Domain objective and/or mission.

### 15.1 Security Management

#### 15.1.1 Identification and Authentication

Support obtaining information about those parties attempting to log on to a system or application for security purposes and the validation of those users

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>User Security</b>	Address based	Token based 2 factor	Smart Card	
		Certificates (x.509)	Kerberos	
		Passwords	Biometrics	
		Radius		
		TACACS		

#### 15.1.2 Access Control

Support the management of permissions for logging onto a computer or network

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Authorization / Access Control</b>	Access control lists	Directory based services		
	X.500	Lightweight Directory Access Protocol (LDAP)		
	Password Protected directories	Active Directory		
	OS based systems			

#### 15.1.3 Encryption

Supports the encoding of data for security purposes.

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Encryption</b>	Data Encryption Standard (DES)	3 DES/RSA	Advanced Encryption Standard (AES)	

### 15.1.4 Intrusion Detection

Support the detection of illegal entrance into a computer system

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
IDS		Signature based	Heuristic / anomaly based	
IPS		Signature based	Heuristic / anomaly based	

### 15.1.5 Verification

Supports the confirmation of authority to enter a computer system, application or network

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

### 15.1.6 Digital Signature

Guarantee the unaltered state of a file

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

### 15.1.7 User Management

Support the administration of computer, application and network accounts within an organization

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
User Management	Product specific	Directory based services		
Security Administration		Product specific		

### 15.1.8 Role / Privilege Management

Support the granting of abilities to users or groups of users of a computer, application or network

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target

### 15.1.9 Audit Trail Capture and Analysis

Support the identification and monitoring of activities within an application or system

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
	SYSLOG	Vendor specific Network analysis tools		
		Vendor specific Forensic analysis tools		
		Vendor specific DB administration tools		
		Vendor specific Host based application tools		

### 15.1.10 Forensics

### 15.1.11 Incident Response

### 15.1.12 Risk Management

### 15.1.13 Addition Security Areas

Physical Security

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Physical access	Key locks	Cypher lock	Smart Card	
		Key card	Biometrics	

Application Security

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Application Security		S/MIME	Transport layer Security (TLS)	
		PGP		
		SSL		
		Middle-ware		
		Signed Java		
		Anti-virus		

**Hardware/System Security**

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Hardware / System Security		Windows Domains  TOPSECRET / RACF TCACS  NDS/Novell  Anti-virus control  Intrusion Detection/prevention systems		

**Data Security**

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
	Embedded passwords	CORBA  Anti-virus control  PGP	AES (encryption)	

**Network Security**

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
		Firewalls / router ACL  IPSEC v4  Encryption (3DES/RSA)  Encrypted VPN  Intrusion Detection/Prevention	AES (encryption)  IPSEC v6	IPSEC v6

## 15.2 Collaboration

Capabilities within this Service Type allow for the concurrent, simultaneous communication and sharing of content, schedules, messages and ideas within an organization.

### 15.2.1 E-Mail

Support the transmission of memos and messages over a network

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Server Side</b>		Cross-platform support  Supports IMAP and / or POP protocols  Rules support	Exchange server roles such as bridgehead services (an internal routing server that ties into Active Directory and applies policy), unified messaging services, client access services (for mobile and remote Exchange access and Web services), and mailbox services (for free/busy lookups and public folder administration)  Support for Web Services  GUI administration interface  Unified messaging  Enterprise Collaboration platform	Cross-platform support  Supports IMAP and / or POP protocols  Rules support  GUI administration interface
<b>Client Side</b>		Ability to tie to a user account  Filtering  Junk mail filters  Folders Support  Address-book  Directory Support	Personal Information Management Systems  Anti-Phishing support	<i>Current + Emerging</i>

		Attachment Support  Supports IMAP and / or POP protocols  Customizable  Supports certificates and encryption		
<b>Mobile Devices</b>				

### 15.2.2 Threaded Discussion

Support the running log of remarks and opinions about a given topic or subject

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Forums</b>				
<b>Wikis</b>		[see section above on <i>Workgroup / Groupware</i> ]		
<b>Blogs</b>		[see section above on <i>Workgroup / Groupware</i> ]		

### 15.2.3 Document Library

Support the grouping and archiving of files and records on a server

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Repository</b>			OAIS standard support for preservation repositories	OAIS standard support for preservation repositories

Description	Example Products	Notes
<b>Document Library / Repository</b>	Novell Server / LAN Stores  DSpace  Document management systems  Content management systems	

### 15.2.4 Shared Calendaring

Allow an entire team as well as individuals to view, add and modify each other's schedules, meetings and activities

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Security</b>		User Level Security		
<b>Access</b>		Group Access Multiple User Accounts Conference Rooms	CalDAV	Group Access Multiple User Accounts Conference Rooms CalDAV

Description	Example Products	Notes
	Exchange Groupwise e-Groupwise Google Calendar Chandler / Westwood Lotus Notes Open-Xchange Oracle Collaboration Suite	

### 15.2.5 Task Management

Support a specific undertaking or function assigned to an employee

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Task Management</b>		Add Resources Progress Tracking Ability to Baseline Event Triggers		

Description	Example Products	Notes
	Exchange Groupwise Microsoft Project Open Workbench Clarity Lotus Notes	

## 15.3 Search

Capabilities within this Service Type provide for the probing and lookup of specific data from a data source.

"It is taken for granted that government information will always be distributed among many resources that are separately maintained. The searching challenge is not to define standards to be implemented at any one site, but to define searching standards that are common to many sites.

"No search service standard should or could fully supplant the many other search mechanisms optimized for particular technologies or communities of practice. Rather, the search service standard for government data and information resources should be implemented typically as a supplement to other search mechanisms that may be required for reasons other than broad scale interoperability. Otherwise, rather than enhancing public access to diverse information sources across government, the ultimate affect might be to collapse that diversity and trivialize information search techniques generally.

### "Major Requirements:

- **Direct access to data:** the search service standard should be of a general-purpose design that is independent of specific access mechanisms. Designing on an abstract model of the search function allows the search service standard to accommodate a wide range of catalogs, directories and databases. The search service standard is required to support interoperable searching of such model registries as these become well-defined. The search service standard should support different levels of access control, such as restrictions by service, session, distributed resource, database, record, or data element.
- **Library catalog search:** Any search service standard must address the huge installed base of public mechanisms for search of government data and information supported among the nation's libraries, and a significant portion of that information is in paper and other tangible media. Public policy interests require that access to information in the public domain must not be encumbered by constraints other than those explicitly provided under law.
- **Internet search engines:** As a practical matter, any search interface standard advocated for use by governments must be able to work with commonly available Internet search engines.
- **Government locaters:** In addition to the public need for cross-agency coherence in descriptions of information holdings, the search service standard should be useful for agencies in organizing information for its internal needs. Government organizations require a search service standard addressing all types of government information held over the long term electronically or in hard copy
- **Search Request / Response:** As a standard specification, a search service is a formal definition of what request messages are handled at the service interface and what response messages may be returned. To maximize interoperability, the search service should be at least implementable over the Internet using TCP/IP, HTTP/HTTPS, HTTP GET and HTTP POST. The search service should be specified in a widely recognized interface definition language such as WSDL (Web Services Definition Language), and that definition should include a query language, a query syntax, and standardization of a result set schema. The query language of the search service standard must precisely define how searches are expressed and communicated between a client component and a server component. The response from a search service will be a result set, that typically lists matching documents sorted by some criteria and each item being available in a selection of original formats or generalized formats such as XML.
- **Structured Information:** To meet requirements expressed elsewhere in this document, the search service standard must support searching of structured information.
- **Semantic Mapping:** The query evaluation function of the search service must be able to handle "abstract concepts" such as name, category, and date according to what they mean semantically rather than merely how they may be labeled syntactically. Handling search concepts at the semantic level is crucial for interoperability, as it is impossible for searchers to know the particular structural elements of every searchable collection.
- **File attributes and object properties:** The search service standard should adopt readily to the underlying data model of named properties and property sets defined for objects.

- **Digital document metadata:** The search service standard should have a history of production use for searching metadata variants.
- **Collection organization:** In addition to organizing content within a searchable collection, designers of search facilities are often faced with compiling information as a logical collection. The search service standard itself should not standardize on any particular approach, but should be compatible with many and diverse approaches to compiling collections of information
- **Service registries:** A gateway approach would allow the search service standard to interoperate with business and services registries using either the ebXML model or the Universal Description, Discovery, and Integration (UDDI) model. This approach would likely parallel the approach for interoperable searching of any registry supporting the ISO 11179 "meta-model" guidelines. These are of particular interest from an infrastructure architecture perspective in that such registries can also hold the key semantic concepts that are essential to further evolution of the search service standard itself. As new communities of practice converge on interoperable searching using their key semantic concepts, these can be placed into a searchable semantic registry.
- **Scalability:** Optimization of any particular implementation should not be constrained by the service itself. A separate issue is the degree to which the standard search service may be operated in parallel against many resources. The standard search service should also be scalable in terms of supporting arbitrarily complex searches.
- **Extensibility:** The search service standard should be adaptable to virtually all search tasks. In addition to the usual sets of data structures and relations, other structure and relation semantics should be definable through profiles.
- **Internationalization:** The search service standard must have be in use worldwide in many languages. It should support negotiation between client and server as to each other's language capabilities for the session. Character set negotiation should also be supported, with support for Latin-1 as a minimum for U.S. Federal Government applications."

*From: Categorization of Government Information (CGI) Working Group, U.S. Federal Interagency Committee on Government Information, December 2004*  
<http://www.search.gov/interop/requirements.html>

Additional Requirements include:

- Supports different levels of access control, such as restrictions by service, session, distributed resource, database, record, or data element
- Supports authentication of user identity through an ancillary service (e.g., e-Authentication)
- Supports verification of the integrity of delivered data, metadata, or other information
- Supports the search service standard for library catalogs accessible over network technologies (ISO 23950, identical to ANSI/NISO Z39.50)
- Supports the library standard for catalog records, Machine-Readable Cataloging
- Supports access to data without mandating proprietary technologies, nor proprietary vocabularies or thesauri
- Can be readily accommodated by leading search products, including Internet search engines
- Supports search of information that may be unstructured (often called "full-text"), semi-structured (typically represented with inline "markup"), or structured (sometimes known as "fielded")
- Supports search of HTML meta element contents and other varieties of metadata embedded within particular types of files (e.g., PDF, e-mail, etc)
- Supports customizable search of other varieties of structured metadata through common mechanisms such as SQL and LDAP
- Provides for interoperable search across locators for information and collections of information
- Interoperable with the international standard search service supporting the U.S. National Spatial Data Infrastructure Clearinghouse of geospatial data

- Implementable over the Internet using TCP/IP, HTTP/HTTPS, *data query structures such as* HTTP GET and HTTP POST, *and XQUERY*
- Precisely defined as to how searches are expressed and communicated between a client component and a server component, including a query language, a query syntax, and standardization of a result set schema
- Specified in an interface definition language such as Web Services Definition Language (WSDL)
- Supports searching of structured information using a nested Boolean query, e.g., (date > '20040101') AND ((subject = 'earthquake') OR (subject = 'temblor'))
- Supports the usual sets of data structures (word, phrase, date, URL.) and relations (equal, greater than, less than)
- Includes a query evaluation function to handle "abstract concepts" (e.g., name, category, date) according to what they mean semantically rather than merely how they may be labeled syntactically
- Supports abstract concepts that are produced by semantic mapping without requiring any particular semantic mapping technique
- Supports gateway to Internet Anonymous FTP Archive (IAFA) file system catalogs and Distributed Authoring and Versioning for the Web (WebDAV)
- Adopts readily to the underlying data model of named properties and property sets that is defined for objects addressable by software
- Already in production use for searching metadata variants such as Dublin Core Metadata Initiative, ISO 15836 Encoded Archival Description, and ISO 8879 Standard Generalized Markup Language (SGML)
- Compatible with many and diverse approaches to compiling collections of information, without mandating any particular approach
- Supports interoperable search of business and services registries, modeled on ISO 11179 Metadata Registries, ebXML, or the Universal Description, Discovery, and Integration (UDDI) model
- Scalable in terms of supporting arbitrarily complex searches
- Scalable in not foreclosing concurrent searches on multiple servers
- Extensible to search tasks with unusual data structures and relations, definable through profiles or equivalent
- Provides extension mechanisms to nurture innovation in areas not yet ready for the broadest level of standardization
- Has been in use worldwide in many languages
- Supports negotiation between client and server as to each other's language capabilities for the session
- Supports character set negotiation, with Latin-1 as a minimum for U.S. Federal Government applications

From: **Recommendations On The Categorization Of Government Information**  
December 16, 2004, <http://www.search.gov/interop/Recommendations-CGI-final.doc>

### 15.3.1 Query

Support retrieval of records that satisfy specific query selection criteria

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Query</b>	Single Word Keyword	Keyword with Boolean and proximity operators  Fielded Search  Phrase search  String Search  Fuzzy Match	Intelligent Content Services	Intelligent Content Services  Keyword with Boolean and proximity operators  Fielded Search  Phrase Search  Fuzzy Match
<b>Query Language</b>		SQL	XPointer  XPath  OQL  XQuery	SQL  XPointer  XPath  OQL  XQuery

### 15.3.2 Precision / Recall Ranking

Support selection and retrieval of records ranked to optimize precision against recall

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Precision/ Recall Ranking</b>		Boolean operators within query to better define search criteria	Natural Language query using Linguistic Analysis  Bayesian Probabilistic Model	Boolean operators within query to better define search criteria  Natural Language query using Linguistic Analysis  Bayesian Probabilistic Model

### 15.3.3 Classification

Support selection and retrieval of records organized by shared characteristics in content or context

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Classification schemes</b>		Examples of "traditional" schemes include:	Semantic web	Dewey Decimal System (DDC)

		<ul style="list-style-type: none"> <li>○ Dewey Decimal System (DDC)</li> <li>○ Universal Decimal Classification (UDC)</li> <li>○ Library of Congress Classification System (LCC)</li> </ul> <p>Subject-specific schemes such as:</p> <ul style="list-style-type: none"> <li>○ NLM (National Library of Medicine)</li> <li>○ Engineering Information (Ei) Classification Codes</li> <li>○ Mathematics Subject Classification</li> <li>○ ACM Computing Classification System (CCS)</li> </ul>		<p>Universal Decimal Classification (UDC)</p> <p>Library of Congress Classification System (LCC)</p> <p>Subject-specific schemes such as:</p> <ul style="list-style-type: none"> <li>○ NLM (National Library of Medicine)</li> <li>○ Engineering Information (Ei) Classification Codes</li> <li>○ Mathematics Subject Classification</li> <li>○ ACM Computing Classification System (CCS)</li> </ul>
<b>Faceted Classification</b>		Subject Domain specific standards		Subject Domain specific standards

### 15.3.4 Pattern Matching

Support retrieval of records generated from a data source by imputing characteristics based on patterns in the content or context

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Sequence Patterns</b>		Exact string match Substitutions Wildcards		Exact string match Substitutions Wildcards
<b>Tree Patterns</b>		Structured Programming Neural Networks		Structured Programming Neural Networks

## 15.4. Communication

Capabilities within this Service Type transmit data, messages and information in multiple formats and protocols.

### 15.4.1 Real Time Chat / Instant Messaging

Support the conferencing capability between two or more users on a local area network or the internet

### 15.4.2 Audio Conferencing

Support audio communications sessions among people who are geographically dispersed

### 15.4.3 Video Conferencing

Support video communications sessions among people who are geographically dispersed

### 15.4.4 Event / News Management

Monitor servers, workstations and network devices for routine and non-routine events

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Management protocols</b>	CMIP Novell SNMP 1.x	SNMP V1/V2	SNMP V3	SNMP V2
<b>Network Monitoring</b>	Home grown & proprietary products	HP OpenView What's Up Gold NetSaint, Orion, Nagios, Servers Alive	IFIX	
<b>Network Capacity</b>	RMON Probes	Lanalyzer eHealth Solar Winds		
<b>Element Managers</b>		CiscoWorks Spectrum Optivity		
<b>Tools</b>		NG Sniffer EtherPeak TCPDump App. Vantage	Alterpoint Opsware	

### 15.4.5 Community Management

Support the administration of online groups that share common interests

### 15.4.6 Computer / Telephony Integration

Support the connectivity between server hardware, software and telecommunications equipment into a single logical system

### 15.4.7 Voice Communication

Provide telephony or other voice communications

## 15.5 Systems Management

Capabilities within this Service Type support the administration and upkeep of an organization's technology assets, including the hardware, software, infrastructure, licenses, and components that comprise those assets.

### 15.5.1 License Management

Support the purchase, upgrade and tracking of legal usage contracts for system software and applications

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
License Tracking		Software/Hardware inventories  Manual notifications for renewals	ITIL processes for process compliance	

Description	Example Products	Notes
License Tracking	JobTrack CA Unicenter TNG	

### 15.5.2 Remote Systems Control

Support the monitoring, administration and usage of applications and enterprise systems from locations outside of the immediate system environment

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Applications Usage		RDP		
Monitoring				
Administration		Change tracking/ auditing  SMS  ManageWise  CA Unicenter TNG		

### 15.5.3 System Recourse Monitoring

Support the balance and allocation of memory, usage, disk space and performance on computers and their applications

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Real-time Monitoring		Resource usage Alerts Automated response engines		
System Availability Monitoring		Short term capacity adjustments Tivoli NetView	Capacity sharing Load Balancing	
Performance/ Capacity Planning (long term monitoring)		Trends based on historical use. Tuning efforts Forecasting		

### 15.5.4 Software Distribution

Support the propagation, installation and upgrade of written computer programs, applications and components

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Desktop				
Server				
Software and OS deployment		Remote installation and maintenance Monitoring and reporting Base lining for fallback ability Novell Zenworks MS SMS/MOM	Unattended, timed and group installations	Elevated credential distribution rollback and version control

### 15.5.5 Issue Tracking

Receive and track user-reported issues and problems in using IT systems, including help desk calls

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
Software Tools for IT Service Management		Unique tools selected to meet needs of the service being offered. (Help Desk, support of a single IT function or application)	<p>Multi-functional service desk tool to support the business as well as IT with reporting and analytical capabilities</p> <p>ITIL process compliant</p> <p>Open Data Standards for information integration / sharing</p> <p>Workflow engines which allow for issue routing.</p>	Integrated tools – platform independent

## 15.6 Forms Management

Capabilities within this Service Type support the creation, modification, and usage of physical or electronic documents used to capture information within the business cycle.

### 15.6.1 Forms Creation

Support the design and generation of electronic or physical forms and templates for use within the business cycle by an organization and its stakeholders

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Form Format</b>		Print and Fill Fill and Print Workflow Enabled (Ad hoc)		
<b>File Format</b>		PDF fill-able Forms Spreadsheet Forms Word Processor Forms		
<b>Access</b>		Access Database on Demand XML Ability to update databases Ability to integrate with databases Ability to integrate with workflow		
<b>Security</b>		Electronic Signature Support		
<b>Web</b>		Postscript Support Macro / POST support	Web Service Support	

Description	Example Products	Notes
<b>Forms Creation</b>	InfoPath MS Office Suite OpenOffice suite	

### 15.6.2 Forms Modification

Support the maintenance of electronic or physical forms, templates and their respective elements and fields

Architecture Component	Twilight Standard	Current Standard	Emerging Standard	Target
<b>Support</b>		Maintainable Versioning	Processes conform to ITIL Change Management	
<b>Form Format</b>		Print and Fill  Fill and Print  Workflow Enabled (Ad hoc)		
<b>File Format</b>		PDF Fill-able Forms  Spreadsheet Forms  Word Processor Forms		
<b>Access</b>		Access Database on Demand  XML  Ability to update databases  Ability to integrate with databases  Ability to integrate with workflow		
<b>Security</b>		Electronic Signature Support		
<b>Web</b>		Postscript Support  Macro / POST support	Web Service Support	

# Appendices

## Appendix I: Technical Architecture Review Board

### Structure of the Technical Architecture Review Board

<add>

#### KTARB Members

The following individuals comprise the KTARB:

Name	Organization
Bill Roth	KITO
Ivan Weichert	KITO
Bryan Dreiling	KITO
Brenda Wilson	KSDE
Cody Ausborn	SRS
Randal Gregg	KDC
Scott Leonard	KSHS
Lori Chavez	DISC
Chuck Crawford	KU
Royce Gilbert	KSU
Alan Weis	LCC

#### Agencies Participated

## Appendix II: KITA Change Control

### *Change Control*

Draft versions 1.x included work in progress during the fourth quarter, calendar year 1998.

Draft Version 2.0 released on December 18, 1998 for limited review and format approval by ITAB and ITEC.

Draft Version 2.1 released in January 1999 included the working version of platform Architecture and completed versions of the Network Architecture.

Draft Version 2.18 released in February 1999 included the completed version of platform Architecture.

Draft Version 3.10 included synthetic versions of sub-architectures in chapters 6-20. These preliminary chapters were gathered from empirical data and interviews with State Agencies, and should be used for reference only (see appendix V for the discussion on the synthetic chapters).

Draft Version 3.11 was a minor revision of Version 3.10. New sections related to the structure of the Kansas Technical Architecture Review Board and its membership.

Draft Version 3.12 was a minor revision of Version 3.11. New sections included Appendix IX, on the Kansas Technical Architecture Review Board, and a revised Chapter 11, Middleware.

Draft Version 4.0 was a major revision of the document structure bringing it into conformance with the architectural groupings of the Kansas Technical Architecture Review Board.

KSTA Version 5.0 was released October 1, 1999, and included several sub-architectures moved from 'synthetic' to 'organic' through KTARB committee activity. Chapters moved to organic (or State directed content) included: Applications Development and Management, Data Management, Platform, and Internet architectures. The Network section had been previously moved to organic status. The remaining sub-architectures continue in their synthetic or as-is status until the release of future versions.

KSTA Version 6.0 was released in January 2000, included updates to all Chapters in Section 1, Chapter 4 (Network Architecture; Voice Network) Chapter 7 (Platform Architecture) and Chapter 18 (Data Management). New, or 'organic' content, for Chapters 9 (Asset Management), 10 (Console Event Management), 11 (Help Desk and Problem Management), 15 (Application Structure), and portions of 19 (Information Management) is also included in release Version 6.0. Roughly 60% of the content of the KITA has been moved from 'synthetic' to 'organic' as of the release of Version 6.0.

KSTA Version 7.0, released in April, 2000, included updates and new "organic" content for the following chapters: Chapter 7 (Platform Architecture); Chapter 13, Change & Configuration Management; Chapter 19, Information Management; and Chapter 20, Security. Chapters remaining to be converted from "synthetic" to "organic" content include: Chapters 8, 12, 16 and 17. Approximately 75% of the content of the KITA has been converted from synthetic to organic as of release of Version 7.0.

KSTA Version 8.0, released in July, 2000, brought the document up to full "organic" content and included new material for the following chapters: 8 Storage Architecture, 12 Change and Configuration Management, 16 Application Infrastructure Services, 17 Workgroup Services, and a new chapter 20, Electronic Records Management. Chapter 20 from Version 7.0, Security Architecture became a new Chapter 21 in V.8.0. Additionally, updated material was included for Chapters 7 Platform Architecture, 9 Asset Management, 14 Application Development and Management, and 15 Application Structure.

KSTA Version 9.0 was released in October 2001, included updates to a majority of the chapters. The "Sub-Assembly" data Appendices in chapters 14 through 17 were relocated to the Appendices at the back of the document. Document structural changes included the designation of "PART" and associating "CHAPTER" with the applicable chapter numbers. Formatting within and between chapters was enhanced and improved.

KSTA Version 9.5 released in October 2002, included updates to some of the tables within the chapters and minor amounts of verbiage changes.

With Version 10.0, released in April 2003, the document's title was changed to be the Kansas Information Technology Architecture. Related naming conventions (references to the Kansas Information Technology Architecture Review Board, for example) were also updated. A major addition was included within chapter 4 (Network Architecture) to treat emerging wireless activities. Significant modifications were also made within chapter 21 (Security Architecture).

With Version 11.0, released in September 2006, Kansas has restructured the KITA to align with the Federal Enterprise Architecture and the NASCIO community. This restructuring will allow us to be able to share architecture standards, directions project statements and targets will any other state or federal agencies using an agreed upon reference structure that supports the business model and services delivered as well as supporting technical architecture standards.

**Appendix IV : Technical Architecture Policies**

***Information Technology Policy #4000 Revision #0***

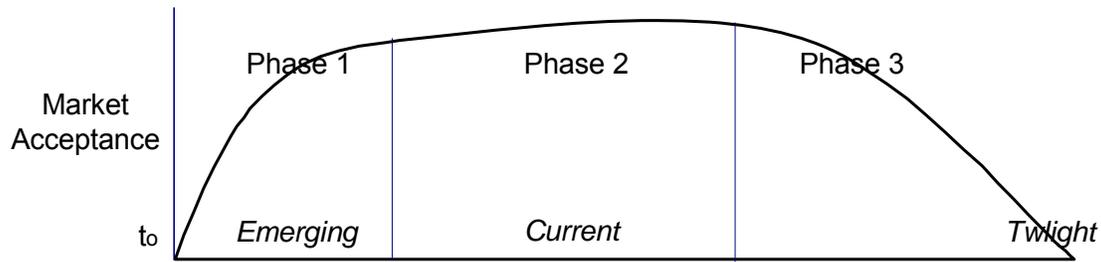
***Information Technology Policy #4010 Revision #0***

***Information Technology Policy #4020 Revision #0***

## Appendix V :Product Lifecycles

The definitions and directions included in this architecture will include product and technology standards. It is important to remember that the computer hardware lifecycle is currently 18-24 months. Hardware, software, products, applications and languages tend to follow a predictable lifecycle pattern. This pattern involves three general phases that can be described graphically as shown in Figure 8.

The x-axis represents time, with the left-most part of the graph representing new product introduction. The y-axis represents market acceptance potential for the specific technology element.



**Figure 8: Technology Lifecycle**

**Phase 1 Emerging.** This is the beginning of the product lifecycle, when the technology is introduced. General market introduction occurs here. Only early adopters will implement these technologies into production environments. For Kansas agencies, procurement of systems and technology from this sector should be approved only under controlled or guarded situations. New technology risks and the lack of operational support usually outweigh any technical features that may exist. Competition will be little or none, and prices will be high. Staff skills to implement and support technologies in this area will be scarce and expensive.

Products, standards and technologies are listed in this category to identify future candidates for standard acceptance and support. As new items progress through the emerging stage of market acceptance, Kansas organizations can request these to be placed into the appropriate emerging sections of the KITA so that future trends and movements can be tracked and considered. Eventually, some elements of the emerging categories will be promoted to the current technical standard. Others in this category will simply drop-off from consideration.

**Phase 2 Current.** With further product integration and development, standards, technology and products achieve market acceptance, both inside and outside the Kansas Information Technology Architecture. Improved market acceptance and need to utilize proven components in state systems will allow for current standards to be defined and outlined.

Agencies wishing to select proven, stable and supported technologies will look to items in this category for near-term implementation. Prices for current standards will have stabilized (and eventually will erode), with contracted/negotiated purchases now made available through standard acquisition processes. Trained and available resources will grow over time. Kansas architects will strive to minimize the varieties and options so as to provide commonality and consistency in technology deployment.

**Phase 3 Twilight.** This phase is also referred to as technology retirement. In the natural course of product lifecycles, all elements will eventually be in this category. Candidates for this category come from current standards. Architecture teams in Kansas will be sensitive to the early retirement or pre-mature retirement of technology components.

Elements listed in this category throughout the KITA are discouraged from future planning, procurement or upgrades. This is not to imply that retired products need to be replaced. New IT systems being planned need to review technology elements that are classified as twilight and avoid any new purchases or inclusion of these options.

**Sometimes, business situations may require the extension of services listed as twilight. These situations can be approved on an exception basis. Support costs and maintenance for these elements will increase over time. Vendors may offer fire-sales discounts for technology in the twilight category. Acquisitions from this category need to be avoided when possible.**