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CENTERS for MEDICARE & MEDICAID SERVICES

SOA & MITA – An Overview

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SOA What?

- SOA represents a fresh, integrated approach to developing IT systems that leverages existing assets while enabling the implementation of business change independent of underlying infrastructure.
- In other words, SOA creates an environment that liberates business functions from technology constraints.
- SOA presents an opportunity to unite geeks and wonks to create a maintainable, extensible, standards-compliant solution that makes everyone happy. 😊
- SOA is about Reuse – common services reduce redundant functions and allow changes to be made once and implemented across the organization.



What is SOA?

Service-oriented architecture (SOA) is a methodology for systems development and integration where functionality is grouped around business processes and packaged as interoperable services. SOA also describes IT infrastructure which allows different applications to exchange data with one another as they participate in business processes. The aim is a *loose coupling* of services with operating systems, programming languages and other technologies which underlie applications.^[1] SOA separates functions into distinct units, or services^[2], which are made accessible over a network in order that they can be combined and reused in the production of business applications.^[3] These services communicate with each other by passing data from one service to another, or by coordinating an activity between two or more services. SOA concepts are often seen as built upon, and evolving from older concepts of distributed computing^{[3][2]} and modular programming.

Wikipedia: http://en.wikipedia.org/wiki/Service-oriented_architecture#cite_note-0

- Newcomer, Eric; Lomow, Greg (2005). *Understanding SOA with Web Services*. Addison Wesley. ISBN 0-321-18086-0.
- Bell, Michael (2008). "Introduction to Service-Oriented Modeling", *Service-Oriented Modeling: Service Analysis, Design, and Architecture*. Wiley & Sons, 3. ISBN 978-0-470-14111-3.
- Erl, Thomas (2005). *Service-oriented Architecture: Concepts, Technology, and Design*. Upper Saddle River: Prentice Hall PTR. ISBN 0-13-185858-0.

Today

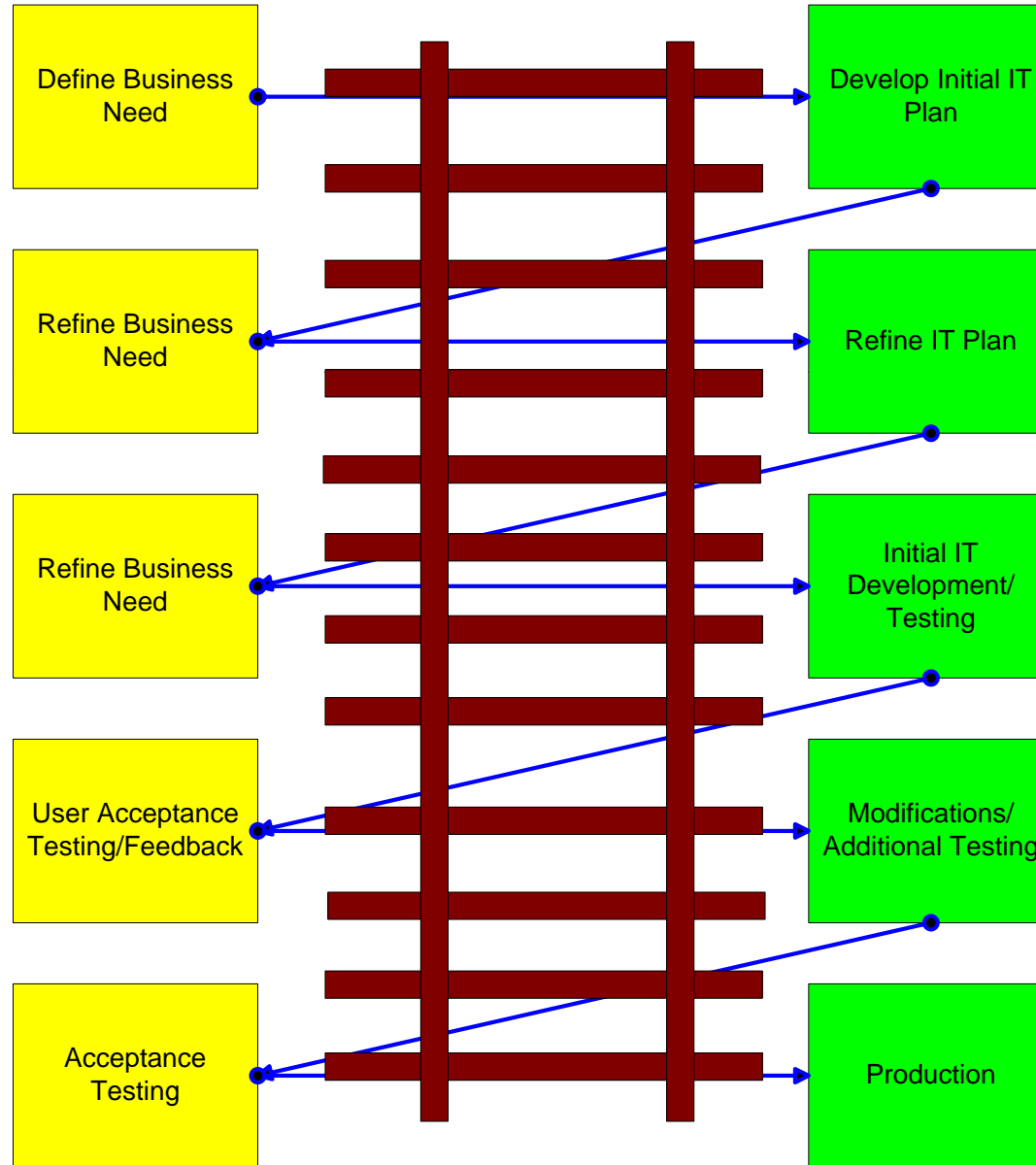
- Tightly coupled systems are difficult and costly to update
- Challenging to isolate functionality to replace with new technology
- Changes are not isolated so “ripple affect” causes programming challenges
- Proprietary data definitions and formats hinder interoperability



Traditional Development Method

(a/k/a "Throw it over the fence")

Business



Technology

Resulting Architecture



Technical Equivalent of Continuing to Use...




...instead of using...





Center for Health Transformation Guidance for Change



**Center for Health
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www.healthtransformation.net

Five Key Principles for Thinking about America in the 21st Century

1. **THE FIRST TEST IS: Do You Want Different Results** than you are currently getting?
Einstein once said “insanity is doing more of what you are already doing and expecting a different result.”
2. **Real Change.** Real change will require real change.
3. **Learn to say “Yes, if” rather than “no, because”** to achieve optimum development of solutions.
4. **New results require new ideas, new actions,** and sometimes, new structures and new cultures.
As President Abraham Lincoln said, “As our case is new, so we must think anew, and act anew. We must disenthrall ourselves, and then we shall save our country.”
5. **Look for and adopt what is already working.** In most areas where we want to create solutions, there are existing fact-based models of success which can be learned from and built upon.

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2

How MITA and SOA Move Mountains...



...one shovelful of dirt at a time



MITA Basics

- Conduct State Self-Assessment
 - Identify As Is and To Be capabilities
- Create Transition Plan
 - Business priorities with information and technical enablers
- Develop IAPD
 - Use traditional and new technology information for development of projects and cost/benefit analysis

SOA Basics

- There is no silver bullet.
- Tear down the fence between Business and IT **permanently!**
 - IT developers need a different approach
 - Business managers need to look beyond their own departments
- Realign governance structures.
 - Partner IT and Business experts *by business process/service*
- No more “rip and replace”. Select an entry point project and take one step at a time.
- Reference models of SOA success.
- Reuse, reuse, reuse

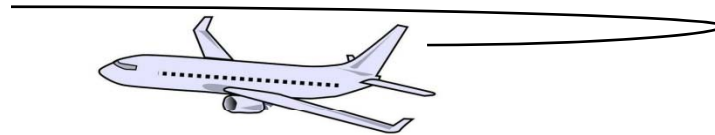
More SOA Basics

- Create allies
 - Internal and external
 - Top down and bottom up
 - Educate the masses
 - Articulate the benefits
- Plan the work, work the plan
 - Plan for success
 - Define and develop governance
 - Foster creativity (with a leash)
 - Banish blame
 - Document and market to expand your allies

SOA Benefits

- Reusability
 - Develop once, deploy repeatedly
 - Both intra- and inter-state exchange
- Reduced risk
 - Smaller projects, reduced risk
- Flexibility
 - System improvements are not tightly coupled implementations

The Orbitz™ Example



- Without SOA
 - Reservations at Hertz™, Hilton™, and United™ are made independently on multiple web sites and require three payment transactions
- With SOA
 - Reservations made with three disparate companies through a single user interface and payment transaction

Which serves **your** travel needs better?



Imagine...

- Leaving the data at its point of origin
 - Real time updates by data “owners”
 - No duplicate storage
 - No synchronization issues
- Unique user interfaces by role
 - Providers see “medical jargon”
 - Patients see “plain English”
- Systematic record location by indexing
- Opt in/out
- Codification of medical data and algorithmic assessment of conditions and treatment options
- Linking patient data by family relationships





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Transitioning to SOA

Bill Branch
FOX Systems, Inc.

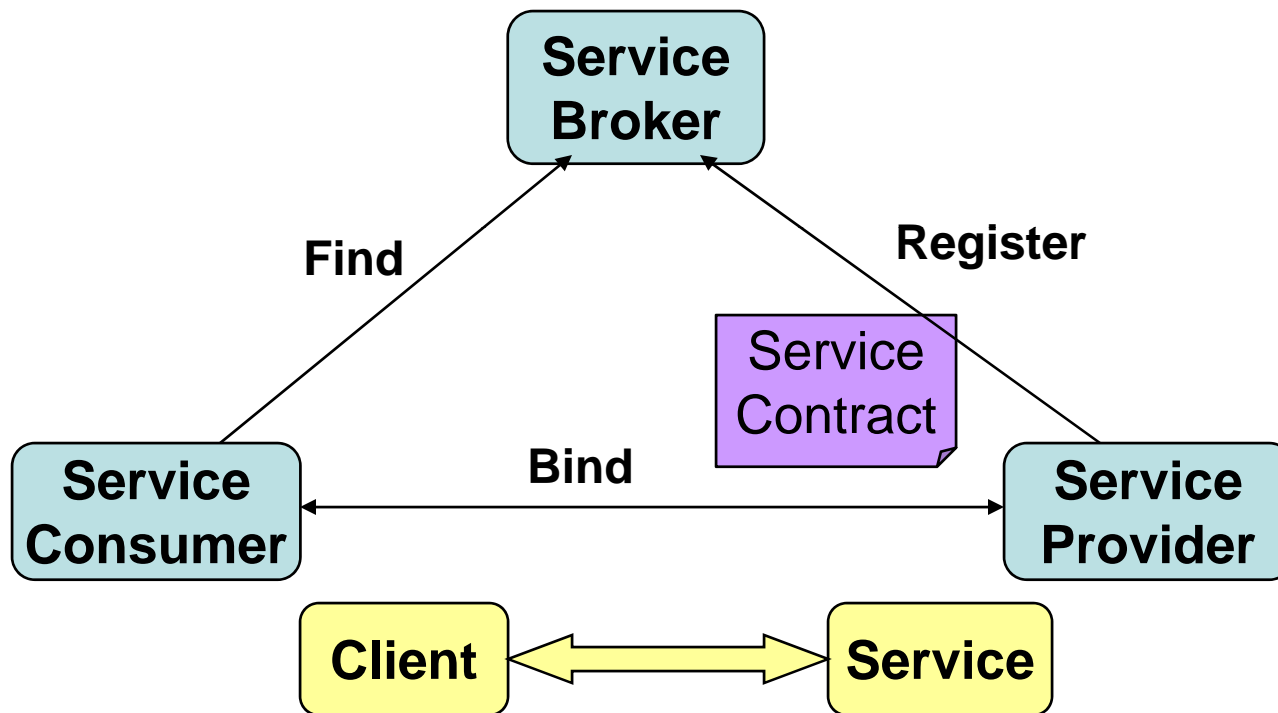
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Agenda

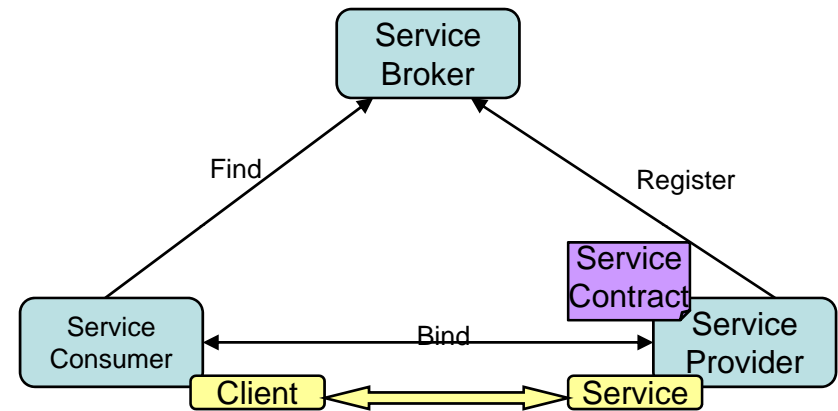
- What is a MITA SOA Architecture
- Incremental implementation strategy
- Wrapping of legacy systems
- Starter kit

SOA Conceptual Model



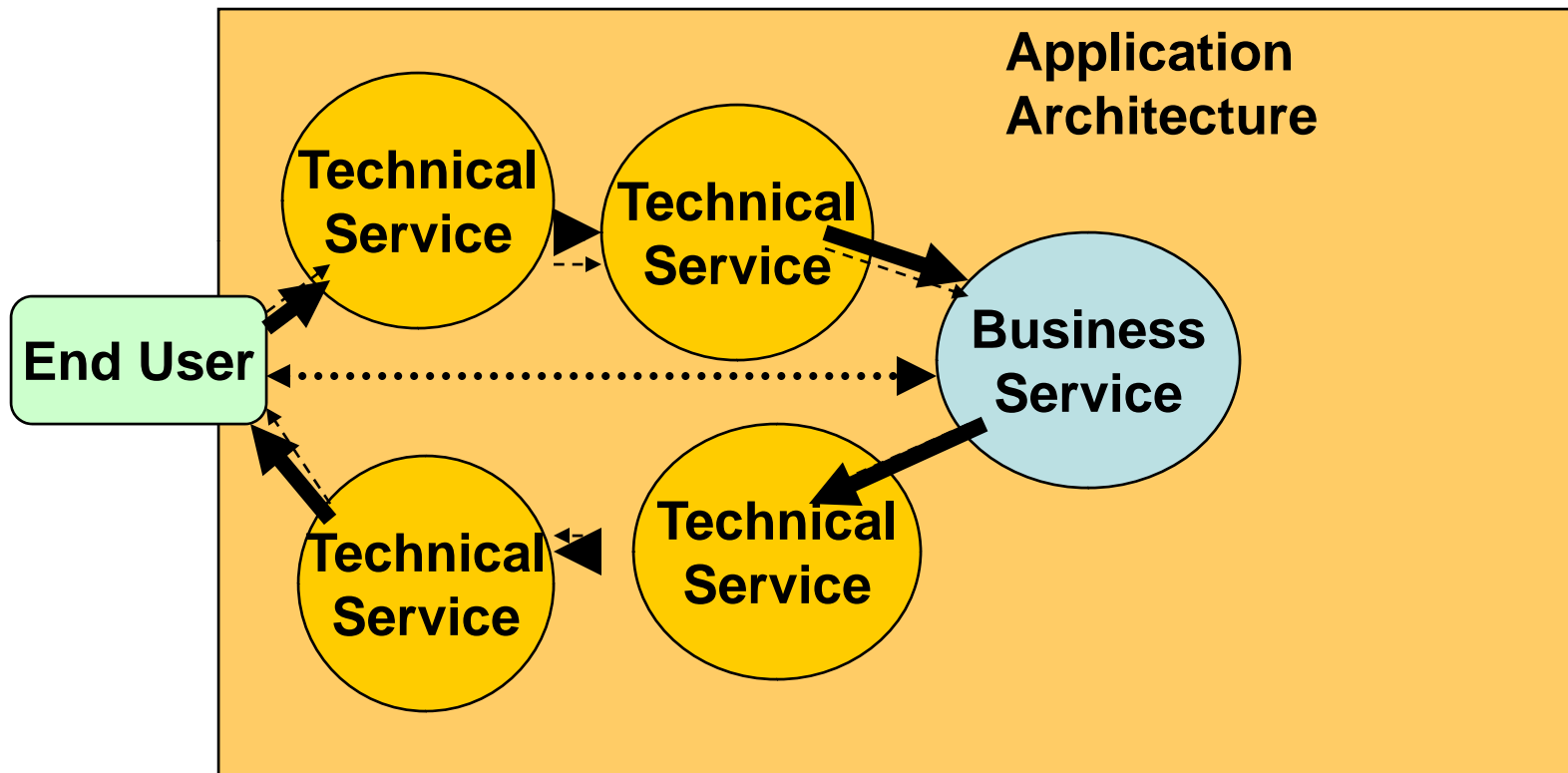
What is a MITA SOA Architecture

- Access to Business process must use the MITA defined Business Service and its standard interface



- There are currently 79 business processes
- Technical services interfacing to the business service or other technical services must be part of the MITA Technical Architecture's technical services inventory

Another View of a MITA SOA



Incremental Implementation Strategy

- Incremental Implementation activities
 - Business Service Selection
 - Technical Service Selection
 - Infrastructure Requirements
 - Tool Requirements
 - Resource Requirements
 - Test
 - Lessons Learned
 - Iteration



Business Service Selection

- Identify the “to-be” candidate business processes. Identify a non-critical but visible set of services.
- Select services that can be piloted relatively easily.
- Constrain the selection so that it can be achieved and success can be measured.

Technical Service Selection

- Identify technical services needed for all business services selected by:
 - Using MITA repository solution sets
 - Developing use cases for all business services selected
- Determine if any technical services already exist
- Identify technical services that need to be developed

Infrastructure Requirements

- Infrastructure products
 - Web service platform
 - SOAP runtime server
 - UDDI registries
 - Trust services
 - Service Monitoring
- Considerations
 - Functionality
 - Performance & scalability
 - Standards
 - Interoperability

Tool Requirements

- UML Modeling tools that support XMI
- WSDL development tools
- Client & service development tools (IDEs)
- XML tools
- Web service testing, diagnostic, and optimization tools
- Code Generators

Resource Requirements

- Staff
 - Required skill mix (skills and number)
 - Required training
 - Identify staff availability
- Estimate Timeline based on:
 - Staff availability
 - Budget availability
 - Procurement availability and schedule
- Estimate cost for project based on summation of following costs:
 - Business service development
 - Technical service development
 - Infrastructure procurement
 - Tool procurement
- Determine if Budget is available and if timeline meets management requirements. Rework all of the above activities.

Test

- After development of project is complete, test the new SOA solution. The test should as close as possible:
 - Run in the operational environment
 - Use operational data
 - Use operations staff and procedures
- Compare results with legacy results if possible

Lessons Learned

- Analyze project and test results
- Evaluate results against the success criteria
- Document lessons learned
- Update all plans, processes, and procedures based on results of implementing project and executing pilot

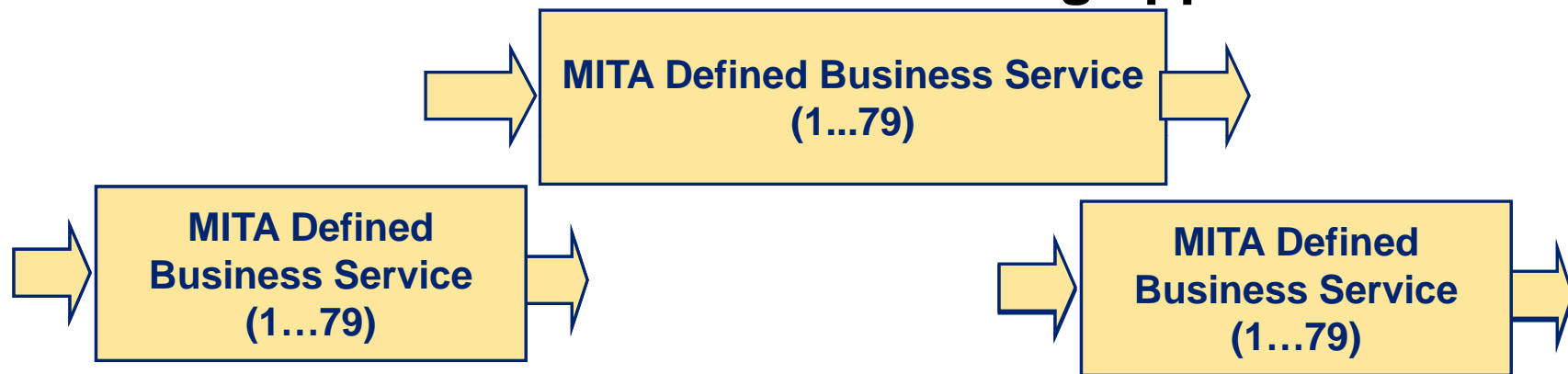
Iterate

- Based on the lessons learned, identify candidates for the next project.
- Next project should have a broader scope than the previous.
- As success builds and staff becomes more experienced, more critical business services can be selected.
- Restart the process by starting with the identify business service activity again.



Wrapping of legacy systems

- What is it ?
 - Create a Standard MITA interface to a MITA Business Service for an existing application



- Why do it?
 - Lower risk
 - Lower cost by making use of existing investment
 - Makes it easier to manage legacy application with the rest of the enterprise

What Does a Legacy Wrapper Include?

- **Web Service Interface** – interface to the outside world that matches the WSDL for the specific Business service
- **Web Service adapter** – translates SOAP request to proprietary API supported by the legacy application.
- **Data Transformation** – ability to accept MITA XML messages and to transform them into messages that are recognized by the legacy application. Also the inverse transformation to go from internal format to MITA XML
- **Legacy Application orchestration** – orchestrate multiple legacy applications in order to achieve the functionality of the MITA Business service.



Legacy Wrapping Concerns

- ***Legacy applications may not align with the MITA defined Business services***
 - Individual legacy application may only align with a subset of a single MITA Business Process. If a number of applications together can fulfill the functionality of the MITA Business Service the wrapper can be designed to incorporate all of the legacy applications to achieve the required functionality
 - An individual legacy application may align with multiple MITA Business Services. This application would not represent a good candidate for legacy wrapping. A possible solution for this is to separate the legacy application into separate legacy applications that align with individual MITA Business Services
 - Many interactive legacy applications have been built with a very granular interface level. These interfaces must be redesigned to reduce the number of messages and to match the MITA Business Service interface

Starter Kit

- In the next year CMS along with the States, MITA team, HL7 MITA Project, and PSTG's TAC will be developing a Starter Kit for States beginning to implement MITA
- The Starter Kit will include
 - Sample MITA business services
 - Sample MITA Technical Services
 - Training Packages
 - White papers

Sample MITA business services

- Sample models and WSDL will be developed for the following MITA Business Services

- Enroll Provider
- Disenroll Provider
- Inquire Provider Information
- Manage Provider Information
- Determine Member Eligibility
- Enroll Member
- Disenroll Member
- Inquire Member Information
- Manage Member Information
- Authorize Service
- Inquire Claim Status
- Manage Claim Attachment

Sample MITA Technical Services

- Sample models and WSDL will be developed for the following MITA Technical Services
 - List is currently TBD but will be technical services needed to support the sample business services

Training Packages

- The following training packages will be developed
 - **Business Process Modeling**
 - **Business Service Development**
 - **Solution Set Development**



Business Process Modeling

- This training package provides the information needed by a State to model business processes using the MITA supported methodology (a constrained version of the HL7 methodology).
- The training package includes:
 - Introduction to Business Process Reengineering and Business Process Improvement (BPR/BPI)
 - Description of business process modeling and its relationship to MITA
 - Description of the Unified Modeling Language (UML) and identification of UML components required for MITA business process modeling, e.g., techniques such as use case modeling, state diagramming, class diagramming, activity diagramming, etc.
 - How to use UML to define MITA business services
 - Specification of desired staff qualification for UML modeling
 - Description of common UML modeling tools
 - Examples of BPM for State implementation

Business Service Development

- This training package will help States define business services based on the UML outputs from the business process modeling. The training package describes how the logical UML diagrams are converted into Java, C, and other types of code.
- The training package includes:
 - UML diagrams required for model driven development
 - MITA repository governance and maintenance procedures for artifacts
 - Iterative approach to service development
 - Various software tools for model-driven development
 - Vendor-specific constraints



Solution Set Development

- This training package provides the training for States and implementers for developing solution sets for business and technical services. A solution set is a combination of services that implements specific capabilities.
- The training package includes:
 - searching for existing solution sets
 - process for developing new solution sets
 - submitting newly developed solution sets to MITA governance for inclusion in the MITA repository
 - maintenance requirements for solution sets

White Papers

- At this time the following white papers have been identified
 - Deploying SOA
 - SOA Governance
 - SOA performance
 - HL7 MITA Style guide



State Transition Planning for MITA

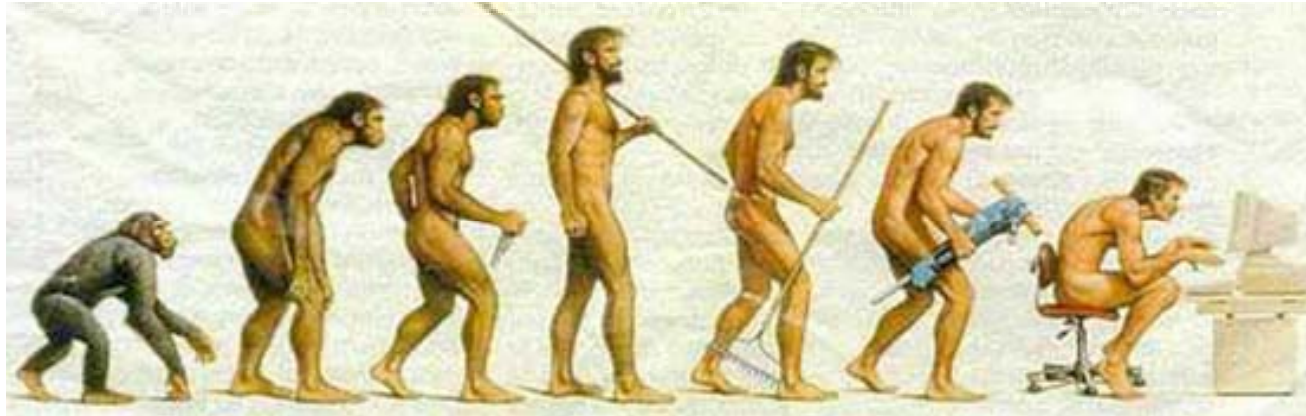
Bob Guenther,
MITA Government Task Lead

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MITA
Medicaid
Information
Technology
Architecture



The MITA Transition Is Evolutionary

“Medicaid Management Info Systems will change over time in an iterative process.

A coordinated effort between business and technical owners will form.

A higher level of stakeholder satisfaction will emerge from this union:

Semantic interoperability and improved healthcare outcomes will be achieved.”

-Nostradamus circa 1555 (*The Lost Quatrains*)

Transition Planning Elements

- High-Level Visioning
- MITA Concept of Operations
- MITA State Self Assessment (SS-A)
- Technical Needs Assessment
- Gap Analysis
- Transition (Strategic) Plan
- APD Creation
- Requirements Definition
- RFP Generation
- Prioritized Implementation Schedule (Roadmap)
- Execution and Iterative Updates



High-Level Visioning

- State-Wide Human Services View
- Other State and Federal Initiatives
- CIO Directives
- Legislation
- Standard Making
- HIT/HIE Considerations
- Stakeholder Influence



*State Medicaid Agency
Mission, Objectives, Goals*

*State Medicaid Agency
Vision for Its Business
5 yrs, 10 yrs*

MITA Concept of Operations

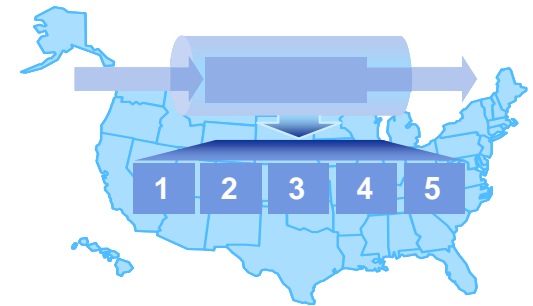
- The State agency describes how it currently meets its goals and objectives regarding:
 - Provider services
 - Beneficiary services
 - Delivery of service
 - Payment for service
 - Improvements in quality and performance
 - Relationships with other agencies and stakeholders
- Then, discusses what improvements it seeks in all of these categories (when and how) - It may talk about enablers and obstacles.
- Resource: Part I Appendix A Concept of Operations Details





MITA State Self-Assessment

- In the Self-Assessment Phase, the State:
 - Aligns its business areas and business processes with the MITA business process model
 - Looks at its current business capabilities (As Is) and develops identifies target capabilities (To Be).
 - Refers to the Agency's COO for guidance on To Be capabilities
 - Documents and prioritizes the gaps between As Is, To Be
 - Assesses technical readiness and gaps
- The SS-A prioritized “To Be” list is the bridge to the Transition Plan and the APD/RFP.



Technical Needs Assessment



- Survey current technical assets
- Based on Results of Business Assessment – address enabling technologies to support “To Be” Roadmap
- If possible/practical – elevate to State EA Level
- Becomes part of requirements and procurement strategy

MITA Gap Analysis

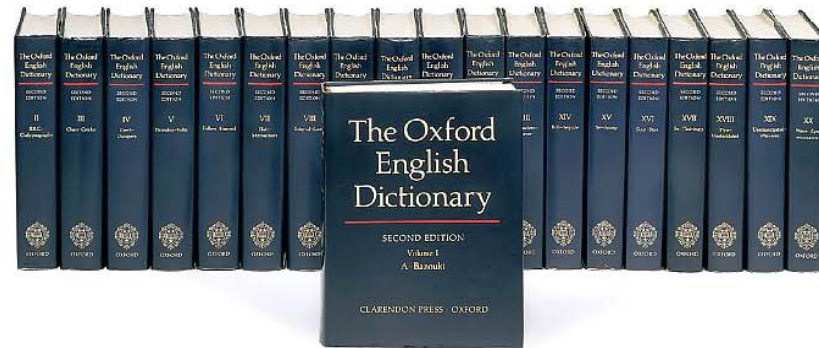
Based on MITA SS-A Descriptions of
“As Is” and “To Be” Definitions:

- SS-A team “measures” the gap between the two and assesses the work required to close the gap
- Analyzes the outcomes and prioritizes the business service projects
- Identifies technical readiness and gaps
- Documents results for use in requirements definition



Transition Plan

By Definition...

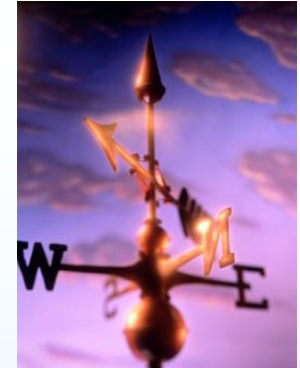


Transition Plan:

A strategic plan is a disciplined, coordinated, systematic, and sustained effort that enables an organization to fulfill its mission and achieve its vision.

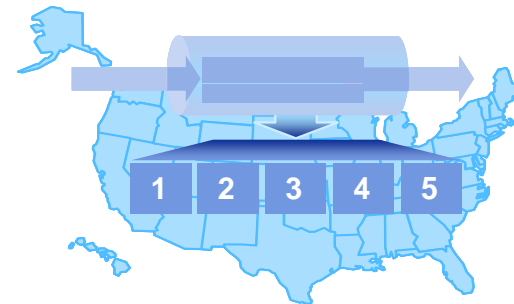
Transition Plan (cont.)

- Considers the Questions:
 - Should we? – what is the value?
 - Can we? – budget, technology, knowledge constraints?
 - May we? – Governance Structure
 - Will we? – Priorities
- Input Involves all Stakeholders (Business & IT)
- Includes Gap Analysis Results and Identifies Work at a task level
- Documents the scope of SOA
- Includes Enterprise Architecture Considerations
- Establish boundaries and alignments with other IT initiatives
- Outlines Iterative Approach to Implementation
- Establish boundaries and alignments with other IT initiatives
- Show alignment of existing and future business initiatives



APD Production

- State Governance determines strategic approach
- Build, Buy, Borrow?
- Draft APD
- Attach SS-A



MITA
State Self Assessment

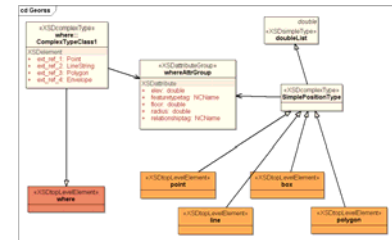


Transition Plan

Requirements Definition

Based on strategic approach chosen
(build, buy, borrow):

- Develop requirements aligned with MITA Models
- Describe business processes and technical functions including To Be Level, Trigger, Result, Activities
- If Level 3, describe IT infrastructure; use UML diagrams



RFP Generation

- Describe Medicaid Concept of Operations, Vision
- Describe Medicaid Mission, Goals, Objectives
- Describe road map, implementation plan
- Present requirements
- Outline contractor and state responsibilities
- Describe testing and compliance plans
- Define alignment with MITA
- Plus standard RFP requirements



Roadmap

- RFP presents milestones that are part of the roadmap
- State should have longer view: 5yrs, 10yrs
- Revisit the roadmap annually to adjust; reset goals, milestones
- State Governance oversees roadmap





MITA
Medicaid
Information
Technology
Architecture



Execution and Iterative Updates

- Transition Plan is actively maintained and managed based on priorities and value-based decisions (business maturity)
- Key stakeholders are periodically involved
- Lessons learned are used for Plan improvements

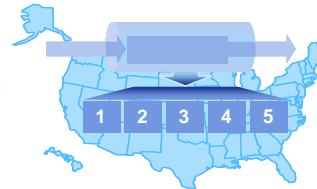
MITA "Line of Sight"



Visioning



Concept
of Operations



State Self
Assessment
& Gap analysis



EA Planning



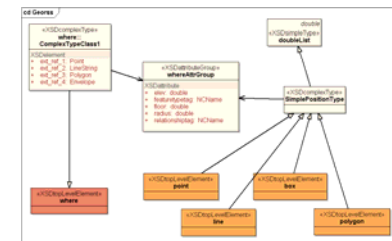
Roadmap



Transition Plan



APD/RFP



Requirements Definition